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# USSR Report

SCIENCE AND TECHNOLOGY POLICY

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10 January 1986

## USSR REPORT

### SCIENCE AND TECHNOLOGY POLICY

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## ORGANIZATION, PLANNING AND COORDINATION

## DEVELOPMENT OF QUALITY CONTROL SYSTEMS REVIEWED

Moscow STANDARTY I KACHESTVO in Russian No 8, Aug 85 p 3

[Article: "The Comprehensive Production Quality Control System: 10 Years of Dissemination, Use and Improvement"]

[Text] The CPSU Central Committee adopted 10 years ago, in August 1975, the decree "On the Experience of the Work of the Party Organizations and Collectives of the Leading Enterprises of Industry of Lvov Oblast on the Development and Introduction of the Comprehensive Product Quality Control System."

In the decree, which recommends the comprehensive product quality control system for extensive dissemination, it was noted that the creative development by the people of Lvov of the know-how of the operation of industrial enterprises, which had justified itself in practice, "made it possible to implement a unified approach to the solution of the problem of increasing quality on a planned basis, to combine the sectorial and territorial methods of quality control." Here it was particularly emphasized that enterprise standards, which "regulate the implementation of all organizational, technical and economic measures, which are aimed at increasing the quality of the output being produced, and establish the sequence of the actions and the responsibility of each performer in the work on the achievement of the high technical level, reliability and durability of products," are an effective means of realizing such an approach.

To date thousands of enterprises of various sectors of the national economy have successfully introduced the comprehensive product quality control system and by means of it have achieved definite gains in the matter of improving product quality: they have decreased the losses from defective output, have reduced the number of complaints, have shortened the time of the assimilation of new products and have increased the proportion of the output of products of the highest quality category. Thus, the introduction of the comprehensive product quality control system has been completed at the majority of enterprises of Latvia, Belorussia and the Ukraine and a number of machine building and other ministries. At the large industrial centers of the country--Moscow, Leningrad, Dnepropetrovsk, Krasnodar and others--the output of products of the highest quality category at the enterprises, which have introduced the comprehensive product quality control system, is 1.5-fold

greater than for the region as a whole and two- to fourfold greater than at enterprises at which the system has not yet been introduced.

The extensive dissemination of the comprehensive product quality control system created the prerequisites for the development and introduction of both sectorial and territorial product quality control systems. At present such systems are being formed in many union, union republic and republic ministries, as well as in republics, krays, oblasts, cities and rayons of the country.

The extension of the principles of the formation and operation of the comprehensive product quality control system to the basic directions of production operations made it possible at the enterprises of Dnepropetrovsk Oblast and Krasnodar Kray to establish respectively the comprehensive system of the control of product quality and the efficient use of resources (KS UKP i EIR) and the comprehensive system of the increase of production efficiency (KS PEP). The experience of their development, introduction and assurance of operation was the basis for the set of state standards "The Management of the Production Association and the Industrial Enterprise," which is now undergoing experimental checking in industry.

The analysis of the experience gained over 10 years of working on the dissemination, use and improvement of plant, sectorial and territorial control systems convincingly confirms the fact, which was noted in the decree of the CPSU Central Committee, that a comprehensive, systems approach to product quality control and its practical implementation by the extensive use of the methods and means of standardization are decisive conditions of their efficient operation.

The gained experience also attests that these mandatory conditions are not sufficient. As practical experience shows, both **WHAT** [in boldface] has been incorporated in the standards and **HOW** [in boldface] the requirements and recommendations, which are contained in them, are fulfilled by labor collectives are important for the assurance of the effectiveness and efficiency of product quality control.

And indeed, if we analyze the activity on product quality control, which is being carried out, for example, within the framework of the comprehensive product quality control system at enterprises, we can see for ourselves that the periodic revision and updating of enterprise standards and the assurance of the irreproachable fulfillment of their requirements and recommendations are complicated, labor-consuming and responsible work, in which practically all the members of the labor collective should be involved. Moreover, all of them and, first of all, the managers of the enterprise and its subdivisions should have the necessary knowledge, ability and desire from day to day to insure the efficient and uninterrupted operation of the comprehensive product quality control system and should periodically change it over to the solution of new, more difficult and responsible problems which stem from scientific and technical progress and the progressive development of the economy in the direction of intensification. Only in case of such work, which does not tolerate incompetence, indifference and formalism, does the comprehensive product quality control system (to the same extent as both the sectorial and

the territorial systems) persistently insure efficient product quality control. Otherwise there can be not question of any efficiency of control.

In this connection it is very significant that in the editorial of the newspaper PRAVDA of 20 May of this year, "The Honor of the Trademark," it is stated: "At leading enterprises these systems, as is known, are yielding high results, wherever they approve of them for 'a check mark,' the number of complaints about items, alas, are not decreasing. Not by chance do the organs of the USSR State Committee for Standards annually revoke tens of certificates on the 'introduction' of such comprehensive product quality control systems which have not justified their designation."

The creation at every enterprise, in every sector and in every region of conditions, which are favorable for the dissemination everywhere, the efficient use and the further improvement of product quality control systems on the basis of standardization, is becoming one of the important directions of the work on the improvement of the mechanism of management at all levels of sectorial and territorial administration, particularly the work on the implementation of the concept of the acceleration of the socioeconomic development of the country on the basis of scientific and technical progress, which was formulated at the April (1985) CPSU Central Committee Plenum.

At the same time both the work, which is being performed by the USSR State Committee for Standards jointly with sectors and departments, on the updating and improvement of the standard methods support of plant, sectorial and territorial control systems and the making of the demands on the acceptance and registration of these systems more exacting with allowance made for their real effectiveness are assuming greater and greater importance.

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ORGANIZATION, PLANNING AND COORDINATION

LATVIAN SCIENTISTS, INDUSTRY HEADS ON EFFORTS TO IMPROVE S&T

Industry, Agriculture

Riga SOVETSKAYA LATVIYA in Russian 19 Jul 85 p 2

[Article (LATINFORM): "Uniting the Potential of Science and Production"]

[Text] The interested discussion of the results of the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress is continuing in labor collectives and party organizations. The pace of the intensification of industrial and agricultural production and socioeconomic development depends on each and everyone. This thought also runs through the materials being published today.

According to the Program of Intensification

Deputy Chairman of the Latvian SSR Council of Ministers and Chairman of the Republic State Planning Committee M. L. Raman

The instructions of the April (1985) CPSU Central Committee and the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress and the speeches of Comrade M. S. Gorbachev in Leningrad, Dnepropetrovsk and Minsk set for the country and for each republic new, very important tasks. They require the changeover to the intensive means of the development of the entire economy, the entire national economy, using for this our enormous production and scientific potential.

In conformity with these tasks we have to ensure the rapid socioeconomic development of the republic and to treat very responsibly the further work on the draft of the plan for the 12th Five-Year Plan. All the prerequisites exist to achieve during the next five-year plan an average annual growth rate of the national income by a minimum of 4 percent.

Is such a task feasible? I believe that it is entirely feasible. If we will purposefully unite the efforts of our science, our design bureaus, production and scientific production associations and all labor collectives. If we will use the entire arsenal of means, starting from the movement for a high quality

of labor at every workplace to the abundant experience of goal program planning and management, which is effective for the implementation of any innovation. Recently I was afforded the opportunity to acquaint myself with the Leningrad comprehensive goal program "Intensification-90." The gains outlined by it to a certain degree also correspond to our tasks for the future. Today we have drafts of 11 socioeconomic comprehensive goal programs and 14 scientific and technical comprehensive goal programs, the work on which is being continued. Of the first group of programs--along with the Food and Energy Programs, as well as the program on the development of the production of consumer goods and services--I specially want to note the program "Quality-90." It, in contrast to similar developments of preceding years, outlines special measures on the increase of the quality of the most important types of products, which are being produced in the republic, so that they would become competitive on the world market.

We are also attaching great importance to other programs. Thus, for example, the program "The Development and Use in the National Economy of the Republic of Local Microprocessor Networks and Systems" is aimed at the sharp increase of labor productivity and product quality. The participants in its formulation and implementation are institutes of the Latvian SSR Academy of Sciences, our higher educational institutions, the very large VEF, Radiotekhnika and Alfa associations and the RAF Microbus Works. Institutes of the republic Academy of Sciences are the developers of the program "The Use in the National Economy of the Republic of Materials Based on Polymer Composites, Including Polyurethanes," organizations of the Ministry of Construction, the Ministry of the Fruit and Vegetable Industry and the Ministry of Municipal Services are their coauthors. Riga Polytechnical Institute, the Latvian State University and the corresponding machine building enterprises are the basic performers of the program "The Development of Computer-Aided Design Systems in the Area of Machine Building." The computer-aided design system increases the productivity of designing by three- to sixfold. These figures speak for themselves. The major scientific and technical program on biotechnology and other programs also promise an appreciable return. At present the formulation of the comprehensive program of scientific and technical progress of the sectors of our republic to 2010, which will specify new milestones for the following period of our development, has been started. Thus, we have a set of programs, in which there are footholds for a rapid advance and the increase of labor productivity. The discipline of the fulfillment of the measures being outlined should merely be increased.

I want to dwell on another important thing. We are deservedly proud of our intersectorial works. Thus, the plant of powder metallurgy is making it possible for each ton of items to save 2 tons of metal, the repair of machine tools at the Daugavpils Latvremstanok Plant increases productivity by 1.5-fold. However, a check of just 4 Riga enterprises--the Sarkan zvaygzne Plant, the Rigakhimmash Plant, the pilot plant of means of mechanization and the VEF Association--showed that 24 screw-cutting lathes, which, among others, the Latvremstanok Plant accepts for repair, were repaired by the enterprises themselves, as they say, out of old habit. Only 22 of the 115 clients submitted on time orders for the study of the need for the capital repair of metal-cutting equipment for 1986. Only 13 enterprises of the republic, besides the Riga Electrical Machine Building Plant, are using in production

parts which were produced by the method of powder metallurgy. Here the total weight of such parts is not much more than that of those which are being used at the Riga Electrical Machine Building Plant, while the number of descriptions is half as many. Thereby the great potentials, which our intersectorial works have, for the present are still being used quite inadequately.

The April Plenum categorically demands the radical reform of the style of work and the sharp increase of responsibility and discipline. This fully applies to everyone--the worker and the minister, the construction superintendent and the academician, including us--planners and economists. The collective of the State Planning Committee is taking immediate steps for the improvement of its activity in conformity with the demands which were advanced at the April CPSU Central Committee Plenum.

#### Support Initiative and Creativity

First Secretary of the Liyepaya City Committee of the Communist Party of Latvia A. F. Yakutin

Among the most important and priority tasks of the acceleration of scientific and technical progress the times are advancing the need for the quickest psychological reorientation of people and the full realization by everyone of the scale and importance of the problems and of his role and place in the common work. The party organizations of our city, in striving for the accelerated transition from the understanding of the tasks to specific deeds, are helping specialists and managers to free themselves from stagnation and fixed routines in thinking and actions and to strive in every possible way to stimulate and support initiative and creativity. Particular attention is being devoted to cutting short the attempts to reduce the process of reform to a short-term campaign and to confine oneself to fussing and empty logomachies.

All the necessary prerequisites and conditions exist in the economy of Liyepaya for the successful fulfillment of the posed tasks. Work is being performed in the city already for the second five-year plan in accordance with territorial comprehensive goal programs, which are being formulated to fulfill the assignments of republic programs. This has made it possible to gain some experience, to increase the directivity of the work of party organizations and labor collectives, managers and specialists and to achieve positive changes and results. The entire increase of industrial production is being provided by the increase of labor productivity on the basis of the introduction of new equipment and technology. The number of people working in industry of the city is decreasing annually on the average by 200. The level of the mechanization of manual labor has been increased from 58 to 63 percent.

Particular attention is being devoted to the assurance of the high technical level and the use of advanced technology at enterprises which are being newly built or renovated. Thus, the first version of the renovation of the Liyepayselmash Plant was rejected in the city party committee because of low mechanization, especially in auxiliary operations and technological transport. As a result a highly mechanized works, which is equipped with robots and overhead technological transport with an automated system of control and

addressing, is now being put into operation. Here the necessary increase of the number of workers was reduced to nearly a third as compared with the initial plan. This became possible owing to the involvement in the discussion of the design proposals of a broad group of engineering and technical personnel and workers and to the use of their initiative. The city party committee is trying to see to it that such a practice of decision making would become firmly established everywhere.

However, there are still many unsolved problems and shortcomings in the matter of accelerating scientific and technical progress. There are many oversights in the assimilation of developed equipment and technology. The capacities of the same Liyepayselmash Plant, for example, are being put into operation already this year: obligations were assumed to do this ahead of time, by 7 November. At the same time only 40 percent of the envisaged assets for objects of the infrastructure have been assimilated, the construction of the vocational and technical school, in particular, has not been started. But it is necessary already today to have morally and vocationally trained people for work at complex and productive equipment.

There is another important question. When introducing new equipment more attention should be devoted to economic efficiency, the improvement of the technical and economic indicators as a whole should be achieved. Take the Liyepaya Fish Cannery. Unique equipment for the production of general-purpose prepared fish has been installed and assimilated here. However, the enterprise does not have the equipment for the production of finished food products from it. As a result, using raw materials at one price, we transport the produced prepared food to Leningrad, where after negligible processing the price of the finished product increases greatly. The profitability of the enterprise is suffering on account of this. It seems that the Latvian SSR Administration of the Fish Industry needs to speed up the supply of equipment to the full complement. Such incompleteness of the supply of production for the present still occurs frequently, worsening significantly the indicators of efficiency. The city party committee also attributes such shortcomings to itself.

Among the most important measures on the technical improvement of production in Liyepaya is the forthcoming renovation of the Sarkanays metalurgs Plant with the changeover of an electric steel smelting technology. However, its preparation is being carried out unsatisfactorily due to the fact that the drawing up of the planning estimates was dragged out. In order to fulfill the task of renovation, the republic Ministry of Construction needs to devote foremost attention to the use of assets for the development of the base of contracting construction and installation organizations and the industrial construction industry, having thereby increased their technical level. Here any oversight can turn into large losses.

The crucial tasks on the acceleration of scientific and technical progress require the improvement both of the economic mechanism and of the style of work and the participation of each and everyone in the matter. The Liyepaya City Party Organization will do everything in order to eliminate the existing shortcomings, to keep up with the arising tasks and to worthily greet the 27th congress of our party.



## The Potential of the Higher Educational Institution

Rector of the Latvian Agricultural Academy V. F. Timofeyev

At the Latvian Agricultural Academy the level and topicality of scientific research has increased, while its results are being introduced more actively in production. In all 29 chairs and laboratories are participating just in the implementation of 2 sections of the Food Program--"Science" and "Personnel." The contact with the All-Union Academy of Agricultural Sciences imeni V. I. Lenin, the Academy of Sciences and the Ministry of Agriculture of the republic is being strengthened. It is noteworthy that the results of several research operations, which were obtained at the academy, are having a positive effect on the state of affairs in a number of agricultural sectors of the republic. However, everything that has been done so far must be regarded merely as the beginning of the solution of new, more important problems. Mikhail Sergeyevich Gorbachev is utterly correct in that higher educational institutions should increase substantially the amount of scientific work.

The urgent directions of research for the next five-year plan have been outlined at the academy. Thus, the study of the methods of programming the harvest of field crops will make it possible to develop technologies which are capable of increasing the yield of cereals to 60 quintals per hectare. The study of biological engineering methods of making potatoes healthier--to technologies which provide an increase of the harvest of potatoes under production conditions by 20-30 percent. Important tasks have been set for scientists in the area of economics, animal husbandry and the mechanization of agriculture and forestry reclamation. It is necessary to continue the modernization of the base of the academy itself and its three educational experimental farms, in order to increase the influence of these farms on scientific and technical progress.

At the same time as the improvement of scientific work and the increase of the personal responsibility of scientists for the end results it is also necessary to increase the accountability of production workers for the introduction of the recommendations of science. For example, although the enterprises of the agricultural equipment association are producing combined tilling and planting units, they are still making them in insufficient quantity. It is also desirable to speed up the placement into operation of another two shops for the production of dry whey for feed purposes.

The acceleration of scientific and technical progress in many ways depends on the level of the training of specialists. The educational process is being improved at the academy. First of all the level of vocational, ideological and political training is being increased, instruction is approximating the requirements of the present. A student school of production organizers is operating here. During the concluded school year we transferred students of the third years of the zootechnic and agronomic specialties to the Yelgava Educational Farm for training and work locally. This is contributing to the improvement of the vocational, ideological and political training of specialists. During the current five-year plan the appearance of our graduates at the places of work through assignment comes to 96-100 percent,

approximately a third of them are being sent to economically difficult farms. Of the 84 agronomists of the 1984 graduating class 24 were appointed to the positions of chief and senior specialists of the farm.

Nevertheless our collective in accordance with the materials of its own serious studies of the level of training of personnel, which have been conducted since 1978 in the rayons of the republic, has sufficient data for the extensive, frank and principled analysis of the tasks on the further improvement of the training system. The academy values the business contacts with rayon agroindustrial associations and rayon committees of the party and Komsomol, which are informing it about the proposals and critical remarks of the communists of farms on questions of the training of specialists. In accordance with these proposals steps are being taken for the improvement of training at the junctions of related specialties, the intensification of economic and management training and the stimulation of the participation of students in the work of the faculty of social occupations. A plan of the computerization of the educational process and research has been drafted and is being implemented.

The route to the acceleration of scientific and technical progress for higher educational institutions, including the academy, passes in the future through the further fundamental merging into a single whole of the teaching process, scientific research and the solution of production and technological problems. It is necessary to broaden the participation of students in contractual scientific research. Students should devise graduation projects, as a whole, on the basis of contractual scientific themes or in accordance with the order of farms and enterprises. It is advisable from this point of view to centralize the financing of economic contractual themes and to concentrate assets in the sectorial ministries of the agroindustrial complex. In the future, apparently, educational scientific production centers will be formed. The urgent need has also arisen to change in the structure of higher educational institutions the procedure of planning and financing science and the working conditions of instructors and to cooperate the use of scientific forces with sectorial institutes.

#### Industrial, Product Development

Riga SOVETSKAYA LATVIYA in Russian 25 Jul 85 p 3

[Article (LATINFORM): "To New Levels"]

[Text] The historic conference in the CPSU Central Committee on questions of scientific and technical progress advanced a program of radical changes in the activity of the national economic mechanism and its management and gave new impetus to the increase of the efficiency of scientific research and the creative activeness of workers. The authors of the materials being published ponder the means of solving the problems which were raised at the conference.

## The Union of Science and Production

President of the Latvian SSR Academy of Sciences B. A. Purin

Today the front line of the struggle for the acceleration of scientific and technical progress passes through science. And the leading role here is being assigned to basic research, only by means of which is it possible to develop fundamentally new technologies, materials, instruments, machines and equipment, which radically transform production.

The Latvian SSR Academy of Sciences holds leading positions in a number of directions of basic and applied research. During the 11th Five-Year Plan alone 17 license agreements and a number of other foreign trade agreements have been concluded and are in force. The share of the export of medical compounds, which were developed in Latvia, is especially significant. Definite gains have been made in the work on the introduction of the results of research in the national economy of the republic and the country. Our academy, being the largest and most highly skilled scientific collective in the republic, is also called upon to coordinate all the scientific forces of the republic for the acceleration of progress in the decisive sectors of the national economy. At present we have outlined the priority directions, on which the main efforts are being concentrated. Among them one should name the improvement of the scientific foundations of the agroindustrial complex, the development of compounds for medicine and agriculture on the basis of biotechnology, genetic engineering and fine organic synthesis, the development of new materials, the optimization of power systems and the use of secondary energy resources.

For the successful fulfillment of the outlined tasks work is being performed jointly with the State Planning Committee on the consolidation of scientific production complexes and the establishment of new ones and on the use of other forms of the convergence of science with production. At the Academy of Sciences the elaboration of proposals on the development and renovation of its experimental base, including the establishment of an all-academy engineering center and a scientific and technical center of information science, is being completed. The solution of this problem involves the placement at the disposal of the Academy of Sciences of one of the industrial enterprises for the establishment of a pilot works and the further construction of science facilities. But the situation is now as follows. During the first half of the year the republic Ministry of Construction fulfilled the plan of construction and installation work by only 36.6 percent, or 19.8 percent of the annual amount. Here I want to note that in other republics the construction workers are treating more responsibly the building of science facilities. I believe that the time has come to reform not only in words, but also in deed, in the spirit of the June conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress.

As was noted at this conference, today it is urgently necessary to shorten the path of the introduction of a scientific idea in practice, which for the present is still long, and to seek new forms and methods of the large-scale implementation of the results of research. This problem also fully applies to

us, the scientists of the republic. I have already touched in part upon several means of its solution. I want merely to add to this that all the units of the chain of introduction: the scientific research institute--the special design and technological bureau--the pilot enterprise--industrial or agricultural production, also have to be analyzed more clearly. For the present many troubles are still being encountered on this route. We should henceforth show greater concern for the advancement of young personnel and for the creation of a truly creative atmosphere at the institutes. The attaining of qualitatively new levels requires of us the more complete utilization of the accumulated potential and the increase of the influence of science on the intensification of production.

#### Reserves Into Use

K. I. Eyzhvertynya, a rewinder of the Daugavpils Khimvolokno Production Association imeni Leninskogo komsomola

The tasks on speeding up the introduction of the achievements of science and technology at enterprises of the republic are also urgent for our collective. The workers of the enterprise understand that we cannot accomplish the tasks posed by the party on the increase of the volumes of the output of products, the improvement of their quality, the increase of productivity and the improvement of working and living conditions without the use of modern equipment and technology.

The task of stage-by-stage renovation with the increase of the volume of production of chemical fibers without halting production was successfully accomplished at the association. We were able to exceed the rated capacity of the enterprise for the production of fibers by nearly fourfold with the simultaneous decrease of the number of workers by 10 percent. It is also pleasing that as a result of renovation the demand for our products is increasing, because they have higher consumer qualities. By means of the improvement of technological processes the strength of cord thread was increased and the production of new synthetic thread like trilaban with a shaped surface was assimilated. It is possible to produce beautiful high-bulk fabric from this thread. The workers of light industry have already come to appreciate it.

The development of creative technical work, efficiency promotion and invention is an important form of the work on the acceleration of scientific and technical progress. In this connection experience convincingly demonstrates the effectiveness of setting up multiple-skill creative collectives.

However, in my opinion, the potentials of efficiency experts so far are not yet being fully utilized. And this applies not only to the Khimvolokno Association.

As a member of the buro of the city party committee, I often have occasion to participate in the discussion of the work of party organizations and economic managers on the establishment of the reserve fund of saving and the efficient use of materials. The impression is forming that for the present the saving is being achieved mainly by means of organizational measures. That is, for

the present we are taking what lies, as they say, on the surface. But technical measures, such as the improvement of technological processes, the replacement of materials and the increase of the efficiency of the operation of equipment, are being implemented inadequately. It seems that there is a large sphere of activity here for the primary organizations and councils of the All-Union Society of Inventors and Efficiency Experts.

The party has posed the task to sharply increase the production and improve the quality of consumer goods. We could also make our own contribution by expanding the output of these items from production scraps. And there are many of them. Of the 6,000 tons of scraps at present only half are being put to use. The remainder are being sent, and, of course, with losses, for processing to other enterprises of the country.

Obviously, this is not practical. And the whole point is that the expansion of the production of consumer goods from scraps is being checked due to the lack of the necessary equipment. The machines, which we have and were obtained by hook or by crook from enterprises of light industry, are of obsolete models. Labor productivity here is half as great as in basic production. The State Committee for Material and Technical Supply is not allocating new equipment to us. For example, the attempts to obtain stitching machines for the braiding of household rugs, which are in great demand among the population, for 2 years now have been unsuccessful. As a result we cannot begin the production of items which people need very much.

In short, our collective is faced with many problems. Therefore, in order to ensure a high rate of development of production, the workers of the association are striving to involve more completely the internal reserves: to develop socialist competition, to tighten up labor and technological discipline and to make more complete use of the advantages of the collective forms of the organization of labor.

#### Both Designing and Assimilation

E. A. Kelpis, chief of the State Special Design Bureau for Sets of Machines for Cattle Farms of the USSR Ministry of Machine Building for Animal Husbandry and Fodder Production

I had the good fortune to attend the historic conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress. The scope and novelty, the breadth of coverage of the problems, which were presented in the report of General Secretary of the Central Committee of our party Mikhail Sergeyevich Gorbachev, produced a lasting impression. It was a question, in particular, of the fact that the quality of new developments is determined by the set of measures on the introduction of scientific and technical progress **AT ALL** [in boldface] the stages of the start-to-finish designing and assimilation of developments.

During the 11th Five-Year Plan 35 machines have been developed by us, and all of them have been introduced in production. These machines are making it possible to completely mechanize farms with industrial technology. Pilot experimental complexes have been built on their basis at such farms as the

Kekava, Dzemtene, Tervete and Adazhi farms, the Sigulda and Krimulda experimental farms and others.

Comprehensive measures on the introduction of the components of scientific and technical progress at all stages of design work were elaborated at the design bureau for the purpose of increasing the level of designing. We intensified patent research and the analysis of the developments of institutes of our country, held jointly with the leading higher educational institutions combined scientific and technical meetings, at which the long-range directions of the devising of new machines and the development of series-produced machines were formulated, and gave specific suggestions on the adjustment of the system of machines for the 12th Five-Year Plan, supplementing it with the lacking equipment.

The next stage of development concerns the increase of the level of the information supply and software of designing. The functions of the developer of the integrated computer-aided design system of the sector have been assigned to us. Therefore, we are interested in the concentration of assets and proportionate participation for the establishment of a sectorial computer-aided design system center of the machine building complex attached to the republic State Planning Committee. This will make it possible on the basis of unified procedural support to use the experience of the computer-aided design system centers of the country and organizations of the republic. The computer-aided design system center will find its place in the system of the management of scientific and technical progress as an organization of interdepartmental scientific coordination in the republic and as an effective means of mobilizing the efforts of scientists, designers, process engineers and production workers.

To date the limited capacities of the tool shops of the plants served by us have moderated significantly the time of the assimilation of new equipment. Today we are producing attachments worth 500,000 rubles a year. The placement into operation of the subroutine of designing and the technological preparation of production will make it possible to retool the experimental works of the state special design bureau and to completely supply the enterprises being served with machine tool attachments for the assimilation of the first industrial series of machines, which were developed by us, and the increase of their output by three- to fourfold.

It is well known that the reliability of items should be demonstrated during operation under extreme conditions. We are striving to shorten the time of tests, by simulating the loads and destructive factors, the data on which have been gathered during service life tests of preceding models and prototypes. The laboratory farms for the study of promising technologies and sets of equipment, which have been set up or are being set up jointly with the Latvian State Institute for the Planning of Rural Construction and farms of the republic, are playing a significant role in the firm establishment of this positive know-how. This will make it possible to fulfill the assignment on increasing the service life of equipment for the countryside.

The assurance during the first year of the output of a machine of the awarding to it of the highest quality category is the concluding stage of start-to-

finish designing. Economic levers are being used successfully for this purpose. When drawing up the report of the distribution of economic stimulation funds for the high quality performance of operations between the state special design bureau and the producer plant an annual bonus fund in the amount of four paychecks for the workers, who are engaged directly in the assimilation of the production of a new machine, is planned first of all. This form of economic stimulation has already been successfully introduced at the Kovelselmash and Yelgavselmash plants and other enterprises.

As a whole the introduction of the examined measures is making it possible to shorten by a third the cycle of the development of machines and their introduction in production.

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ORGANIZATION, PLANNING AND COORDINATION

BELORUSSIAN INSTITUTE HEAD ON IMPROVING LEAD TIMES, OTHER PROBLEMS

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 85 p 8

[Article by Corresponding Member of the Belorussian SSR Academy of Sciences, Doctor of Technical Sciences Professor Anatoliy Ivanovich Sviridenok, director of the Institute of Mechanics of Metal Polymer Systems of the Belorussian SSR Academy of Sciences (Gomel): "Increase the Contribution of Science to the Economy"]

[Text] The collective of the Institute of Mechanics of Metal Polymer Systems of the Belorussian SSR Academy of Sciences is the initiator of the socialist competition under the motto "All Scientific Developments to the Level of Inventions," which has been launched in the republic. How is the contribution of science to the economy to be made more significant? Director A. I. Sviridenok reflects on this.

A mechanical engineer by education, Anatoliy Ivanovich Sviridenok has worked at the institute since the moment of its founding--more than 15 years. He began as a designer and was a scientific associate, the chief of a laboratory and deputy director. Since 1979 he has been the director of the institute. He is a doctor of technical sciences, a professor and a corresponding member of the Belorussian SSR Academy of Sciences.

The efficiency of the national economy and the rate of our growth, as was noted at the June conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress, in many ways depend on the structure and quality of materials. Unfortunately, in the total volume the share of advanced nonmetallic materials for the present is still small.

And although there are already 1,100 inventions to the credit of our institute, while the economic impact from the introduction of the results of research has exceeded 28 million rubles, the collective believes that this is not the limit. That is why we took many critical remarks, which were made at the conference, to refer to us. For at our institute composite materials or, as is customary to say, composites are being devised, the technologies of their production and equipment for processing are being developed. And no



matter how impressive the achievements of the scientific collective are (in accordance with the results for 1984 the institute was awarded the Red Banner of the CPSU Central Committee, the USSR Council Ministers, the All-Union Central Council of Trade Unions and the All-Union Komsomol Central Committee with placement on the All-Union Honor Roll at the Exhibition of USSR National Economic Achievements), today they do not satisfy us. The party requires us to compare the results of scientific research not with yesterday, but with the highest world level and to boldly invade the unknown.

### The Impact of Scientific Developments

On the basis of my own observations I can say that invention at an academic scientific institution plays, in addition to a scientific and technical role, an important sociopsychological role. In bringing the result of his work up to an invention, a scientist in most cases "is drawn" into the process of its further realization, which leads to closer and more fruitful contact with production workers.

I will cite several examples of the "invention--development--introduction" cycle.

It is well known that in modern machine building the need for means of the preservation between operations and the long-term preservation of metal items is great. The composition and the technology of the production of anticorrosive film, which is intended for the preservation and packing of metal items and provides them with effective protection in an ordinary and aggressive medium, were developed at our institution jointly with the Special Design Bureau of Analytical Instrument Making of the Ministry of Instrument Making, Automation Equipment and Control Systems. The rate of corrosion of metal under the film is reduced to nearly one-tenth. The process of preserving and packing metal items with the new anticorrosive coating has been automated. The film protects especially effectively against corrosion the parts of instruments and tools. In the process of the development and introduction of this new method 28 inventions emerged.

Metal pipelines are being used extensively for the transportation of corrosive liquids at enterprises of the chemical, food, pharmaceutical and metallurgical industry and in agriculture. They require the large expenditure of stainless steels and nonferrous alloys. Glass withstands chemical attacks well, but the pipelines made from it are not strong and are fragile, while the sites of the joints are unreliable.

The scientists and designers of the institute in collaboration with workers of the State Institute of Glass and the Soyuzsteklomontazh Trust developed a new technology and automated equipment for the production of polymer sheaths, which perform strengthening, protective damping and insulating functions. This not only increases the reliability of the glass pipeline. The sheath is a component of the automated systems of the monitoring of leaks and the warning of an emergency rupture. For the second year now the Gomel Glass Plant is producing about 300 km of glass polymer pipelines, which is making it possible to save up to 3,000 tons of metal pipe and more than 4.5 million rubles.

There is another interesting operation: small additions to large-tonnage series-produced thermoplastic materials made it possible to obtain self-lubricating materials which differ substantially from analogues of a greater wear resistance. The new composites, technology and designs of friction assemblies are protected by 68 certificates of authorship for inventions and are being used extensively in motor vehicles and tractors, agricultural and textile machinery, machine tools and conveyor systems. The economic impact from the use of 1 ton of items is 10,000 to 30,000 rubles.

In addition to the named developments, today we are offering the national economy conducting lubricants and electromechanical materials with a reduced content of precious metals; a technology of obtaining economical filtering materials and coatings for reclamation construction; heavily loaded ferrites and mineral fertilizers with a set solubility.

From a theoretical point of view our institute is in "the era of composite materials." However, an era is an elastic concept. The scientific principles of composites, which are called, by analogy with computer technology, fifth-generation materials, are being formed already today. They are capable of adapting themselves to diverse external actions, of giving components a multifunctional nature and of operating successfully under exacting, extreme load, speed and temperature conditions.

The first attempts to develop such materials and components were made at the institute. In particular, the use of liquid crystal systems, magnetically sensitive systems or systems, to which a "deformation memory effect" has been imparted, as functional additives to liquid and solid composite materials makes it possible to control their properties. But polymer materials, which are in a certain state, can, for example, in a bearing, perform, in addition to friction functions, the role of a generator of an electric current and in a corrosive medium can provide additional electrochemical protection of the shaft.

We have all the opportunities to be in front, and we will not miss them.

#### The Competence of the Scientist

There is a problem which for a long time has bothered me and my colleagues who are engaged in the development of new materials and technologies. Work in this direction is being performed not only here. And the competence of the modern scientist depends directly on the level of his information.

In our country a well-balanced system of the generation, gathering and storage of scientific and technical information has been developed and is constantly being improved. Unfortunately, it is impossible, in my opinion, to say this about the system of the dissemination of data and about their use in the national economy at the level of organizations and enterprises.

The existing procedure of the free, in practice popular receipt of scientific and technical information suffers, in our opinion, from a serious flaw. Every scientific organization, of course, strives to bring its operations up to a high level of completion and to make their results competitive. In order to

achieve this goal, it is necessary by a certain time to protect one's technical secrets. This is especially important under present conditions, when information resources in value are being equated to energy and raw material resources, when in the world a pursuit of new ideas is literally under way and the industrial espionage of foreign firms is flourishing. The examples of how an innovation, which originated in our country, is realized very quickly abroad and is offered to us as a licensed product, are well known.

Today, alas, it is practically impossible to keep a scientist from the premature publication of the results of his scientific research. The publication of basic propositions and dissertation projects is a duty. Finally, it is impossible to disregard the aspiration for scientific prestige and the desire to see one's work published. High-handed actions and bans will not help the matter. It is necessary to back them with measures of an economic nature.

The cases of the "false" use of inventions, in order merely to report back to the superior organization, are disturbing. As a result the real return is zero. Meanwhile, the 5-year period of the recording of the efficiency of an invention begins on the day of the report to state statistics organs. In this way considerable harm is done both to the authors of the invention and to the collective which is the developer.

It is necessary, in our opinion, to create such conditions so that the collective as a whole and each worker of it separately would be interested in the state deriving the maximum benefit from the investments in science and from new scientific and technical information. A unified license system of the dissemination of scientific and technical achievements should be put into effect in the country. This will make it possible to create sufficiently strict conditions of the selection at the earliest stage and to expedite the use of the most effective inventions in the national economy.

#### Accelerate Introduction

If you ask developers what influences most adversely of all the time and quality of the development of new technology and equipment, then, I am convinced, the answer will be unanimous: "The making up of sets and supply, the state of the technological base." Here, for example, is how much time was spent on the development of one of the versions of the experimental model of a machine of average complexity--an extruder for the application of polymer protective filtering coatings on plastic drain pipes.

The designing process took about a year. Then the list of standard equipment in conformity with the procedure, which exists at the institute, was turned over to the client. About 3 years were spent on the order and the obtaining of the basic elements of the device--extruders, pressure regulators, automation components. Production took about another year. The sum total is 5 years. And this is not the worst case.

Even within the framework of the fulfillment of the most important assignments of the all-union scientific and technical comprehensive goal program it is not

possible to speed up the solution of supply problems. Designers and process engineers spend months, and at times years on the search for electric motors, bearings, sensors and measuring instruments, which are needed for the experimental model in small quantities. It is possible to obtain something directly from industrial enterprises, by exchange and so on. But in this case as well far from the best of what is available is obtained. As a result the equipment, which is new in its technological idea, proves to be excessively materials- and power-consuming.

The technological base of pilot production also requires constant updating, since today machines tools and casting and pressing equipment with a "length of service" of 12-15 years are being used in it.

I believe that it is expedient to develop a flexible operational system of the supply of scientific and technical programs of all levels through the corresponding territorial organs. But the repeal of the established ban on the release of resources in small quantities by industrial enterprises to scientific institutions is the most urgent step.

Our collective greeted the decree of the CPSU Central Committee, the USSR Council of Ministers and the All-Union Central Council of Trade Unions "On the Improvement of the Remuneration of the Labor of Scientists, Designers and Process Engineers of Industry," which was published a few days ago, with satisfaction and regards it as great concern of the party and government for the personnel who are in the front line of scientific and technical progress. We are already preparing for work in the new way and are confident that the introduction of the new principles of the remuneration of labor at our institute will contribute to the further stimulation of the creative activity of specialists.

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## ORGANIZATION, PLANNING AND COORDINATION

### ACADEMICIAN ZHUCHENKO'S SCIENTIFIC WORK REVIEWED

Kishinev SOVETSKAYA MOLDAVIYA in Russian 25 Sep 85 p 3

[Article by M. Lupashku, VASKhNIL [All-Union Order of Lenin Academy of Agricultural Sciences imeni V. I. Lenin] academician, active member of the MSSR Academy of Sciences: "At the Forefront"]

[Text] It is both easy and difficult to talk about Aleksandr Aleksandrovich Zhuchenko, a leading scientist, talented scientific organizer, and pedagog.

It is easy because his entire scientific life for us, his colleagues, is, so to speak, in plain view. He grew up before our very eyes, making his way from agronomist to president of the republic's Academy of Sciences. And it is difficult because it is a very complicated matter to present the essence of an in-depth search of the scientist within the framework of a small newspaper article or to give even a fragmentary illustration of the range of his scientific and social concerns and interests.

The desire to know the unknown and the talent of a researcher were evident in A. Zhuchenko even in his student years. First at the Kishinev Agricultural Institute and then at the Higher Agricultural Institute imeni V. Kolarov (Bulgaria) he took his first, far from timid, steps in science. The topic of the diploma thesis which he defended so well found further development in his practical activity during his years of work at the Kagul Experimental Station of the Moldavian Scientific-Research Institute on Irrigation Farming and Vegetable Raising.

He did not abandon his scientific investigations after he became sovkhos director, and later glavk chief of the republic's Ministry of Agriculture. He conclusively merged his life with science by heading up the scientific-research institute, and later also the largest scientific-production association in the republic--"Dnestr."

It would seem to be a totally unrealistic task--to combine with complete selflessness his administrative work with the most intensive scientific activity. However, A. Zhuchenko was and still is able to do this even now. As the

general director of the NPO [scientific-production association] "Dnestr", he put much effort into the formation of this association, into improving the level of research performed here, and into strengthening ties with production. These same years also became quite productive in the sphere of his scientific research. Their outcome was a fundamental monograph on the genetics of tomatoes, which gained deserved recognition of domestic and foreign scientists. For this work, its author was awarded the Gold Medal imeni N. I. Vavilov in 1974.

The works of this period gave further development to the ideas of Academician N. I. Vavilov in the sphere of the application of the genofund, the theory of selection, and the specific genetics of plants. Working in conjunction with the NPO collective which he managed, A. Zhuchenko developed and broadly introduced into production an industrial technology for cultivating vegetable cultures.

His work in the MSSR Academy of Sciences allowed the scientist to more broadly realize his creative potential. He had the possibility of seeing the horizons not only of biological science, but also mathematics, physics, chemistry, economics, and the social sciences. While heading up the Academy of Sciences, A. Zhuchenko achieved a significant growth in the effectiveness of the work of academic institutions and a strengthening of the ties of fundamental science with production. At the same time, he gave particular attention to the comprehensive development of fundamental research and its thematic and organizational unification with the sectorial institutes and scientific-production associations. He is one of the initiators of the transition to problem-target planning of scientific-research and experimental design work. The Center for Automation of Scientific Research and Metrology and unique problem-oriented complexes were created at his initiative.

Aleksandr Aleksandrovich Zhuchenko is the author of around 300 scientific works. He substantiated and formulated the basic positions for the ecological genetics of culture plants as an independent scientific discipline studying the genetic nature of adaptive reactions of plants. This direction became a principally new, most widespread and practically significant theoretical base for guiding the adaptive reactions of organisms. The ecological-genetic conditionality of recombinational variability in higher plants which he discovered has not only an important significance for the synthetic theory of evolution, but also for the practical application of plant growing. This was the basis for development of methods of induced recombinogenesis, cell and pollen selection. It also gave an ecological substantiation for the strategy of the adaptive system of intensification of agricultural production.

A. Zhuchenko's research in the sphere of specific plant genetics, in the development and application of the genofund, in energetic analysis in agriculture, and in the methodological bases for intensification of the APK [Agrarian-Industrial Complex] is also of great importance. The concepts developed by the scientist and his school made it possible to formulate a number of new positions in the synthetic theory of evolution, selection and agroecology based on the evolutionary systemic and ecological approaches to the adaptive potential of plants. Today these and other directions are being successfully developed at the recently created Institute of Ecological Genetics of the MSSR Academy of Sciences.

The main result of his many years of research may rightly be considered his monograph entitled "The Ecological Genetics of Culture Plants," which, according to the reviews of leading scientists, "must be viewed as an all-encompassing one-of-a-kind monograph on the applied genetics of culture plants, which is deeply substantiated and highly successful."

"After discovering the possibilities of induced mutagenesis," writes Academician N. Dubinin in particular, "the problem of guiding inherited variability was associated generally with the problems of mutagenesis. However, recombination presents a second strong factor in evolution and selection. A. Zhuchenko has focused attention on the problems of guiding recombination at a new level, since the basis for understanding this phenomenon was the principle of adaptation of the genetic systems themselves...In doing so, Zhuchenko raised the development of problems in adaptive selection to a high level and presented a new illustration of the significance of problems of recombination for synthetic evolution."

A. Zhuchenko successfully combines his scientific and administrative activity with extensive socio-political work. He is a member of the Moldavian Communist Party Central Committee, a deputy of the USSR Supreme Soviet, a deputy chairman of the USSR Supreme Soviet Commission on Soviet Nationalities for the Protection of Nature and Rational Application of Natural Resources, a member of the VAK [Higher Certification Commission] under the USSR Council of Ministers, a member of the Committee on USSR Lenin and State Prizes in the Field of Science and Technology, and chairman of the MSSR Committee on State Prizes in the Field of Science and Technology.

The colleagues and students of Academician A. Zhuchenko are impressed by his "obsession" with science, his goal orientedness, his high exactingness, and his colossal work capacity.

Today in the laboratory, tomorrow in production. This is the credo of the scientist. This is the principle which he persistently brings to life.

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## SCIENCE AND TECHNOLOGY POLICY

### MEANS OF FACILITATING SCIENTIFIC-TECHNICAL REVOLUTION

Moscow LITERATURNAYA GAZETA in Russian 18 Sep 85 p 10

[Article by V. Struminskiy, academician and laureate of the Lenin and State Prize: "Attack on the Barriers: On the Means of Development and Reserves of the NTR [scientific-technical revolution]]"

[Text] Regardless of how we call our time--the atomic, space or microelectronics age--its essence is determined by the scientific-technical revolution. It is specifically in the epoch of the NTR that the predictions of Marx about the transformation of science into a direct productive force of society are coming to pass before our very eyes. This is a force which decisively renews the technological world surrounding us and has a favorable effect on all aspects of our life. However, the new content of science has entered into contradiction with its old organizational forms. The NTR is called upon to overcome this contradiction and to make a radical turnaround in customary concepts and a decisive leap toward a qualitatively new level of development. Yet the struggle, including the struggle for accelerating scientific-technical progress, does not occur painlessly.

### FLEXIBILITY IS NEEDED

It was still quite recently that sociologists and futurologists predicted a significant growth in the army of scientific workers. This was considered a foregone conclusion and a gratifying fact. The front of research necessary for creation of examples of new, more complex and improved technology is steadily expanding in all the economically developed countries of the world. For example, in order to develop new forms of airplanes with subsonic speed, only about a thousand hours of wind tunnel operations were required; for airplanes with supersonic speed--up to 10,000 hours. The appearance in the near future of airplanes with hypersonic speed will, of course, require even longer testing. The collectives of researchers and the experimental base must be strengthened accordingly.

The growing differentiation in the sciences is also associated with a many-time multiplication in forces. The tree of knowledge has begun to branch out rapidly. Each new field has formed its own detachment of specialists and is rapidly filling its ranks. Looking into the future, it would seem that we need only to continue these tendencies. But what would be the result of this? If the number of scientists begins to double on the average every 10 years, the rate



of further development of the NTR would require the impossible--to involve almost the entire earth's population into scientific and experimental design activity. Otherwise the movement would come to a standstill.

This is a historically familiar situation. In the past, when the great geographical discoveries led to the intensive growth of trade and the expansion of small handicraft production, it may also have seemed that in time everyone would have work in the craft shops--from the small to the great. However, the industrial revolution of the 18th century followed the path of specialization and division of physical labor, which made it possible to increase its productivity, and in combination with technical means to sharply reduce the need for a work force.

A similar occurrence is happening today--only in the sphere of mental labor. Its division promises an unconditional benefit--the study and understanding of complex processes, phenomena and objects is becoming deeper. However, further division of the intellectual functions and narrowing of the sphere of competence of various specialists is fraught with negative consequences. Specifically, the dissociation between scientific and engineering-technical workers is intensified. Oftentimes "barriers of misunderstanding" arise between them. Moreover, collectives of scientific-research institutes of broad profile become extremely non-uniform in their composition. All this taken together opens the door into science for poor workers or those who have no direct relation to science.

I often remember the instructive story of overcoming the so-called "sound barrier." At the beginning of the war, the effort was made to take it "head on," using rather powerful engines for bringing airplanes to supersonic speeds. Such efforts were made in England, the USA, France, and most persistently--in Germany. Many of them ended catastrophically: pilots died, and the flight apparatus was broken against the invisible wall of resistance. Soviet scientists first conducted extensive research on the laws of wing aerodynamics and other airplane elements at windspeeds approaching sonic. The results of the theoretical and experimental works were well-known: supersonic flight conditions were mastered by us, the first in the world, not only by military aviation, but also by civil. The attack on the "sound barrier" ended victoriously through the study of new forms of airships with arrow-shaped wings.

As we have already said, science in our day is taking on a new content. Outdated organizational forms have lost their flexibility. They do not allow for quick reaction to the needs which may arise and do not meet the tasks presented by the scientific-technical revolution. This process has already for some time been visibly manifested in all the economically developed countries. Various efforts at eliminating the indicated contradiction have in most cases been unsuccessful. The administration of large foreign companies has sought detours. For example, ascribing secondary importance to the existing scientific centers and institutes, it has begun assigning the development of current problems to the most gifted and creatively active scientists. They received large funds, knowingly selected their co-workers and helpers, and rented facilities, equipment, and computer technology. The assignment was fulfilled in the shortest possible time and at a high scientific-technical level. This organizational form in science has come to be called that of the "thinking corporations" and has become widespread.

Temporary scientific-technical associations for solving specific problems in short time periods are also successfully operating in our country. But it is no less important, I believe, to concentrate attention on the internal reserves existing in the scientific-research institutes, increasing the responsibility and conscientiousness of scientists and creating an atmosphere of intolerance for loafers and idlers in science.

#### AN IMITATION OF CREATIVITY

Today in a certain sense it has even become the fashion to speak of the possibilities of seeking reserves and increasing the effectiveness of science and the creative return of scientists. The miscalculations in planning and financing are analyzed with envious matter-of-factness and uncompromising nature. Shortcomings in instrument supply, in the system of incentives, etc. are disclosed. The strange thing is that one simple question is very rarely raised: is it really necessary to carry on this research and to develop this branch of science? Would it not be better to concentrate our efforts and means in another, more promising, direction?

Of course, those whose interests are vitally involved prefer not to ask such questions. However, this does not remove these questions from the order of the day. The need for timely and harsh re-evaluation of priorities only becomes more acute. Here we must speak of overcoming the so-called psychological barriers.

In our country it is sometimes easier to open another branch of an institute or to unify it with an enterprise than to properly equip an effectively operating scientific institution. Under such conditions some institutes grow at an unsubstantiated rate, chronically suffer from dealing with too many topics, and endlessly duplicate each other's work. It is specifically here that groups and groupings of certain "monopolists" arise, defending with exceptional stubbornness the old, customary directions, even if it is clear that they show little promise. Resting on mutual support and trying to secure their place in science at any cost, such groups create inflated authorities and bring to life unsubstantiated although convenient decisions. In doing so, they bring great harm to society and inhibit scientific-technical progress. Unfortunately, this is the reverse side of that intensification of science on whose crest random people often penetrate into it, knowing how to adapt themselves and to imitate creative activity. Sometimes these are simply careerists who have no relation to creative work.

Participants of various scientific congresses, conferences and discussions may note that among scientists, as a rule, it is not the custom to criticize one's colleagues on principle questions, for their selection of an unpromising, and sometimes even erroneous direction in research. Individual results, the approach and the formulation of experiments--here we may see some critical comments. However, the entire idea on the whole is usually discussed in a general sense and with extreme care. What is behind this--a false notion about the ethics of a scientist? Not only this, we believe.

In order to justifiably criticize a certain direction in research, one must undertake a colossal work. Sometimes months are required to trace step by step the course of research, to correlate the expended efforts with the obtained results, and to evaluate their degree of promise. It sometimes happens also that the final conclusion may be obtained only by repeating part of the experiments or by performing control tests. Unfortunately, this huge control work is, as a rule, not evaluated by anyone in any way.

All this leads to the situation whereby in discussion of scientific-technical works some scientists prefer to remain silent and try in every way possible to avoid expressing their points of view. Others, on the contrary, eagerly and smoothly speak out on problems which are far outside their sphere of competence. When such irresponsibility occurs at the level of a dissertation review, its consequences are felt only by the colleagues of the future candidate or doctor of sciences. But if it is manifested in the discussion of general directions in the development of science and technology, here the detriment may become felt within the scope of the entire sector or even the entire country...

The most decisive measures are needed to curtail the activity of people who are incompetent in scientific questions and who allow lack of objectivity, irresponsibility and voluntarism in the selection of means of scientific development. This purpose may be served, specifically, by a state examining board, which I have long proposed for practical introduction as a reliable means of combatting subjectivism in science, weak unqualified works, and research directions which are self exhausting. The periodically renewed composition of such commissions or boards should include leading specialists who are performing the most fruitful and creative work in the given branch of science, who have original printed works--without co-authors!--on their selected topics, and who have an independent character undaunted by authority and a well-developed sense of the main line. They must be given sufficiently broad authority, placing upon them also the full measure of responsibility for the proper selection and evaluation of short- and long-term prospects, for making decisions and for giving recommendations.

#### WITHOUT EXCESS LINKS

It is no secret that there are institutes of broad, barely discernable profile, who formally seem to deal with everything, but in essence do nothing at all. And they do not answer specifically for anything. We must neither create such institutes nor prolong their useless existence in any form. There may be one criterion for selection: if the scientific-research organization is the leading one in the country on a number of problems, or at least one of them, then its right to life is undoubted. However, to make a scientific "fuss" and to create "subsidiaries" under each ministry along the principle that "although it's bad, it's our own" is ruinous to the country's national economy.

Nevertheless, we may cite numerous examples in which plant or VUZ laboratories take on the solution of the most complex problems, having neither the material-technical base nor the qualified personnel to do so, and therefore end up

"spinning their wheels." And on the contrary, there are cases where academic institutes strive to create examples of "their own" technology, to introduce into production the results of their own, often very incomplete developments without consulting the sectorial organizations and plant design bureaus. Both situations are doomed to failure and are a waste of time and money. Isn't this the reason why the assimilation of hundreds of technical innovations drags on for decades?

The barriers between the academic and the sectorial, the fundamental and the applied sciences hinder the introduction of all that is new and progressive. I had occasion to come upon these barriers. The USSR Academy of Sciences Sector on Mechanics of Nonuniform Media which I head up had developed a theory of technological processes associated with the movement of solid, liquid and gaseous media, which made it possible to open up significant technological reserves in an entire series of sectors of the national economy. However, it was impossible to confirm them due to an absence of the proper experimental base, which we have been unable to "push through" to this day. We checked only the technology of small diameter turbine reactors on our installations, and then went to experimental-industrial testing. These tests showed, by the way, the real possibility of increasing the output of valuable production by 4-5 percent and reducing the expenditure of energy alone to 1/10 - 1/15 the amount used in Japanese and West German technology. However, the management of the sectorial institute and the ministry glavk on science and technology gave us no support, but rather became the main barrier in the path of the new technology.

What hinders work cooperation? In one case--a jealous attitude toward the authors of promising ideas, in another--the orientation toward the simpler purchase of foreign equipment, in a third--a simple misunderstanding of the seriousness of scientific proposals and future benefits, etc. How can we overcome these obstacles? In my opinion, we must work it out so that at the very beginning of the development of fundamental problems or immediately after obtaining the first positive results, the sectorial scientific-research institutes must be assigned to the academic institutes in order to bring the matter to mind, or more precisely, as they say, to the metal. Only then will we sharply reduce the times for introduction of the latest scientific achievements into industry and will overcome this problem as such.

At the same time, I would like to note that the overwhelming majority of heavily overgrown sectorial institutes work at a level which does not meet current requirements. Evidently, a portion of their subdivisions should be handed over to industry in order to strengthen the plant scientific sector. In this case, it is necessary to increase the responsibility of enterprise directors for the fate of innovations, allocating them the necessary material-technical resources. It is time to establish direct close contacts between scientists, engineers and production personnel--over all the barriers.

In light of the information presented above regarding the division of labor in science and specialization, we must admit that institutes of unlimited broad profile (general problems in physics, chemistry, mechanics) have lost their right to existence. Recently, for example, I was present at the report of a director of one peripheral mechanics institute. Yes, they are performing

a series of interesting works there, but the same works are being performed, as we know, in a number of other places. I asked the speaker: "Can you name those sectors of theoretical and applied mechanics in which your institute is the leading one in the country, i.e., the strongest authority?" He vacillated for a long time, but was unable to answer...I believe that today every director of an academic or educational institute must have a clear answer to this question.

The realization of this type of proposal will in no way reduce the scientific potential. It will only facilitate its effective application. Ultimately, a scientist cannot be superfluous if he is a real scientist, and not simply one who participates in science. The recently adopted measures for increasing the social acceptance of scientific and engineering labor and in strengthening creative endeavor in it are aimed at rewarding true scientists. The high quality fulfillment of work--a smaller number of workers with greater return--will now be stimulated, and this attitude toward the matter must be cultivated in every way.

There must be a breakthrough in the minds and attitudes of the scientific cadres from top to bottom. According to the principle presented in the speech of M. S. Gorbachev at the meeting in the CPSU Central Committee on questions of accelerating scientific-technical progress: "The work which lies ahead is not "mending holes" and not a simple merging or division of organizations, placing workers from one chair into another. The questions of improving the organizational structure must be resolved bravely, with substantiation, and most importantly--comprehensively, and only comprehensively--from the highest to the lowest segments, along the vertical as well as along the horizontal."

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SCIENCE AND TECHNOLOGY POLICY

LOCAL INTERESTS STIFLE DEVELOPMENT OF NEW CRUSHER INSTALLATION

Tallinn SOVETSKAYA ESTONIYA in Russian 6 Sep 85 p 2

[Article by Ya. Tolstikov, SOVETSKAYA ESTONIYA special correspondent: "If the Ministry Allows...Intersectorial Organization is Being Drawn Ever More Tightly into the Departmental Harness"]

[Text] Our newspaper has written repeatedly about the work of the SKTB [special design-technological buro] "Effekt"--an innovative firm created in the republic 5 years ago. In doing so, we tried to support the new organization and aid in its further development. In fact, this publication has the same goal, although the reason for writing it is somewhat different.

Recently a rather curious letter arrived from Moscow addressed to the Chairman of the Estonian Republic NTO [scientific-technical association] Council B. Korchemkin and Chairman of the ERS VOIR [All-Union Society of Inventors and Innovators] G. Melits. The letter stated: "The SKTB 'Effekt', working in conjunction with the ESSR Academy of Sciences Institute of Chemistry, is conducting research on the development of a pulverizing-separation installation (DSU), which is intended for processing and concentrating mining-chemical raw materials. We request that you carefully study all the materials pertaining to the development of the new DSU, its degree of readiness for industrial application, and the means of practical realization for inclusion in one of the scientific-technical programs or for review by an interdepartmental commission on questions of accelerating the introduction of particularly important inventions under the USSR Gosplan [State Planning Commission] into the national economy."

The letter was signed by VSNTS [All-Union Council of Scientific-Technical Societies] Deputy Chairman D. Levchuk and VOIR Central Council Secretary N. Naumov. Immediately we thought: this is how far our "Effekt" has progressed if its developments have been noted in such high places!

But in general there was no reason for rejoicing. It turned out that no work on the development of new or the improvement of existing DSU was being done at the SKTB--it was discontinued at the end of 1982. At that time, it is true, the SKTB designed and built four laboratory units of original crushers according to the technology developed at the ESSR Academy of Sciences Institute of Chemistry (authors--candidates in technical sciences R. Kokh and A. Kitsnik).

However, the management of the SKTB—Director K. Salev and Chief Engineer Kh. Sillari—considered their mission accomplished at this. The director of the ESSR Ministry of Local Industry Institute R. Sepman, to whom the buro was subordinate, agreed with this decision, as did also Deputy Minister Kh. Reedik, who dealt with this organization. Moreover, the chief enthusiast in favor of the design and further development of the DSU, buro Chief Designer V. Taydonov, despite objections on his part, was hastily re-assigned to other jobs, which, as he was told, were more important (intended for the enterprises of the republic's Ministry of Local Industry). And for his efforts at continuing the research on the crushing installations which he had begun, V. Taydonov was sternly warned (verbally, it is true): do not self-manage and do not contradict the management. However, V. Taydonov, with the aid of the republic VOIR council, nevertheless continued his work on developing the crushers, although on a volunteer basis.

And now this letter from Moscow. As it turns out, isn't there a prophet in our homeland? Haven't they evaluated the importance in the SKTB of the work which they have begun? Haven't they felt the prospects? Everyone knew very well, in their own way, and evaluated it quite correctly. We will stress the words "in their own way"—based primarily on their own local industry, or rather small-scale interests.

But first let us give a little prehistory. Those four laboratory samples were manufactured by orders from the Tallinn Polytechnical Institute, the All-Union Institute of Mineral Raw Materials (VIMS) and the Scientific-Research Institute "Uralsmekhanobr." There they successfully passed the necessary tests.

The operating principle of the centrifugal-deflecting mill (the basis of the crushing installation) is externally quite simple. The rock or ore (or any other raw material loaded into the crusher mill) is thrown off as a result of the effect of centrifugal force to the periphery of the drum along whose walls are the deflector blades (rotation speed reaches 200 revolutions per second). The raw material is pulverized as it is repeatedly deflected from the walls. Also, and this is particularly important, the pulverization occurs down to a strictly defined granule size—no more and no less. It is not over-pulverized. This means that there is a sharp reduction in the amount of by-products—slime going to the waste heaps and polluting the environment. Moreover, the ore pulverization takes place selectively. The heavy fraction is separated from the lighter one in the crusher. All this significantly distinguishes the DSU from the standard, for example, globe mill, in which all the fractions are pulverized uniformly, or from the disintegrator, which produces excessively fine pulverization far from suitable for all types of production. In both of these cases, no provision is made for the separation of the fractions.

Here is a quote, for example, from the protocol of tests of the TsOM-250 performed at the Scientific-Research Institute "Uralsmekhanobr": "...the noted advantages of the tested crusher (we have already spoken of them—Ya. T.) allow us to conclude as to the expediency of further continuing work with this semi-industrial installation. ...It is expedient to recommend that interested organizations participate in work on the industrial assimilation

of the technology of crushing and concentrating minerals with the application of the TsOM." The results of the tests were confirmed by the deputy director of the "Uralsmekhanobr" institute on scientific work.

According to the calculations of the Urals branch of the VNIIG [All-Union Scientific-Research Institute of Metallurgy], the industrial introduction of the DSU will make it possible to increase by 25 percent the output of quality mineral fertilizers at the existing ore enriching combines. The Tallinn innovation can also make an important contribution to the resolution of the country's Food Program.

And here is what is said about the economic effectiveness of the TsOM application, compiled at the Institute of Mineral Raw Materials: "The anticipated economic effect from the introduction of a scheme with the application of the TsOM at an experimental plant processing 2.9 million tons of ore annually will comprise 2.6 million rubles."

Almost a ruble for every ton! And there are not millions, but billions of such tons processed in our country annually. These are phosphates, shale, potassium ores, bauxites, and manganese ore. This is how great the anticipated effect may be!

Of course, the SKTB has all these documents, and the "Effekt" managers are very well apprised of what they are (or rather were) dealing with.

However, the industrial application of the DSU is still very far away. Naturally, several laboratory samples of the mills cannot yet serve as the basis for designing a series-produced machine. First it is necessary to develop a semi-industrial model, solve a number of technical problems, and most importantly achieve increased wear resistance of some of the crusher parts. It would seem natural to continue the work, especially since this is our own creation, born through the joint efforts of Estonian specialists and scientists, including those at the "Effekt" SKTB.

The fact that an original crushing installation emerged from behind the walls of "Effekt" was reported several times in the republic press. The bureau managers eagerly presented this fact as an example testifying to the intersectorial character of work carried on within the new organization. In doing so, they made it clear that the innovative firm corresponds to its extra-departmental designation. However, as subsequent events showed, this advertisement served as a unique camouflage and cover for the bureau managers.

A report on the multiple deflection mills developed in Tallinn also appeared in the journal IZOBRETATEL I RATSIONALIZATOR (No 2, 1982). An influx of letters poured into the republic's capital addressed to the SKTB, asking to place orders for the manufacture of the mill, to send out blueprints, and to take part in further developments of the DSU, etc. Such letters came, for example (aside from the already mentioned VIMS and "Uralsmekhanobr") from the State Scientific-Research Institute on Mining-Chemical Raw Materials (GIGKhS), from the Urals branch of the All-Union Scientific-Research and Design Institute on Metallurgy (UralVNIIG), from the Leningrad Scientific Research Institute



Giprokhim, from the "Novokramatorskiy Machine Building Plant" production association, from the "Pobedit" Plant, and from the "Soyuztverdosplav" VPO. The letters are still coming in.

And what are the SKTB managers doing? They should be happy at the popularity which their brainchild is enjoying. However, to take new orders, including orders for the manufacture of a semi-industrial sample, would mean to take on considerable responsibility for the quality of the future innovation. This did not enter into the plans of the SKTB managers, nor into those of the Ministry of Local Industry itself.

So, in response to the interested organizations and enterprises, the SKTB sent rejections signed by the managers. Sometimes they were outright rejections, and sometimes veiled in the phrase "If the ministry allows..." (knowing full well the directive of the Minmestprom managers--not to accept orders from beyond the boundaries of the republic whenever possible). Some requests were left with no response whatsoever. And the matter, as we know, came to a final standstill.

Chief Engineer Kh. Sillari now says quite frankly, "We will not deal with the mills anymore. The work is too complex for us."

SKTB Director K. Salev is more diplomatic. "Often we don't know what to do first, which orders to accept and which to reject," he says. "And sometimes, it is possible that we accept the wrong ones or refuse when we shouldn't."

As a nonspecialist, I cannot categorically affirm that "Effekt" should now continue work on the DSU. However, a number of the arguments "against" can, in my opinion, be refuted.

It is affirmed, as we have already said, that the small (in reality, a relatively small--40 standard units) republic innovative firm is in no position to accept orders for the DSU coming from the Urals, Leningrad and Moscow. Granted. But even the very same "Uralmekhanobr," VIMS, or LenNII Giprokhim could serve as the proving ground for the development and testing of semi-industrial samples of the DSU. These could be used at the same time in the republic itself--serving the quarries of the Maarduskiy phosphorite deposit, and soon also in Tools, serving Estonian chemists and power engineers using shale as a raw material.

The Minmestprom managers, taking a strictly local position, are in essence contradicting themselves. The decision of the Ministry governing board dated 24 July 1985 devoted to questions of accelerating scientific-technical progress directly states (point 6): to provide for maximal cooperation with the country's leading scientific-research institutes and to utilize the results of their work--this is stated in regard to the Ministry Institute, as well as in regard to "Effekt," which is specifically subordinated to it.

"Yes, possibly we should continue work on developing the DSU," institute Director R. Sepman agrees, though not altogether convinced. "But not to head up this work--we don't have sufficient forces for this."

However, this is not entirely true, either. There are forces, although they are dispersed over several departments. The "Dezintegrator" SKTB (where A. Kitsnik is presently working) is currently engaged in the problem of developing the crushers, as is the NIPI [scientific-research and design institute] on silicate concrete and the Tallinn Polytechnical Institute. Judging by the letters, the specialists at "Uralmekhanobr," VIMS, and GIGKhS are ready to devote themselves to this problem. Who better than the SKTB "Effekt"--the intersectorial innovative organization--is there to head up this work. One of the primary purposes of the firm is to coordinate the efforts of specialists in various departments in solving key intersectorial problems on accelerating scientific-technical progress.

And there are presently good organizational as well as economic prerequisites for this. We know that a government directive was recently adopted which provided for the creation of temporary collectives of scientific and engineering-technical workers called upon to solve current problems of an intersectorial character. This is exactly what "Effekt" needs! (As well as all the other organizations solving specific problems in the development of new technology). If only it would grab this opportunity! But even this is now being rejected as being too complex.

By the way, the Ministry governing board decision which we have already mentioned cites the need to provide for an increase in the capacity of the SKTB "Effect" by about three times in the 12th Five-Year Plan. This includes, obviously, an increase in the number of specialists employed by it. And in order to develop a DSU laboratory, only three or four additional staff units are required.

As concerns the work for the "Vazar" Association, to which V. Taydonov was in his time so hastily re-assigned (remember?), this was fulfilled about a year ago, but still has not found application in production. Yet to speak of the comparative economic effectiveness of one and the other is simply awkward. In our local, so to speak, variant--this presupposes tens of thousands of rubles in savings (which is also not bad), but in the broader aspect, keeping in mind the DSU, this, as we have already noted, denotes millions. Which task, then, should be given preference? The answer, in my opinion, is synonymous.

Why, then, such stubborn resistance? What could be its possible motives? We can speculate on the matter. The bonus payments from the introduction of new technology may, according to the directive, reach up to 6 months wages in any given year, no more, for the managers of a project design-technological organization. K. Salev and Kh. Sillari "collect" their norm, primarily at the expense of already firm orders received from the republic's local industry enterprises. And from the mills they would have to wait for a return! Sometime the effect will be realized...

We are always speaking of "intersectorial" and "extra-departmental." Yet the department--Minmestprom--here it is, right next to us (or more precisely, above), with its staff, raw materials and equipment. The departmental--financial and material dependence--of the innovative firm is clear.

Yes, we may once again thank the managers of Minmestprom for agreeing in their time to take the newly created organization under their wing (we must agree

that there was a certain risk in taking such a step). And without delving at the present time into the topic of subordination (or over-subordination) of "Effekt," we must nevertheless ask: what does the Ministry of Local Industry have to do with all this when we are speaking of the development of the technical policy of the innovative organization? Absolutely nothing. The technical policy of "Effekt," as written in the Directive on this buro, is directed by the scientific-technical council. It was assumed when the firm was created that this council would be comprised of a number of active members in NTO and VOIR, of the republic Gosplan, scientists, and production specialists--a unique extra-departmental Council of Directors. (Clearly, it is up to this Council to decide which orders to accept as first priority, based on their economic effectiveness).

But, alas, there is no such council even though, we repeat, exactly 5 years have passed since the creation of the innovative firm. And local industry is gradually taking this intersectorial organization into its hands. At first only one-fifth of the jobs were performed by order of local industry enterprises. Today already half of all the work falls to Minmestprom. Yet it is perfectly clear that certainly not one-fifth, and especially not one-half of all the innovations developed in all sectors of the republic's industry and awaiting their turn for introduction are related to this one single department (and no exception are those introduced with the aid specifically of "Effekt"). The distortion is clear. From the "light" hand of the Minmestprom specialists, the aphorism has been born and gone "to travel the wide world". This aphorism seems to quite aptly reflect the current position of the buro: "Whoever keeps the horse in his stable is the one to ride it."

And they do indeed ride, believing, evidently, that this is as it should be.

And what about the managers of the republic NTO and VOIR councils? I must first say that the attitude toward the letter from the union departments has not yet been definitely formed at the ERS NTO, judging by the expressions of B. Korchemkin, and an answer to the request of VSNTD and VOIR Central Council in Moscow has not yet been sent.

And this is probably the main point. It is somehow improper to express critical comments aimed at B. Korchemkin and G. Melits who in their time have put forth so much effort in creating, and then in formulating the new organization. However, we will have to do so. Who but the republic NTO and VOIR councils--organizations which have concentrated in their hands the scientific-technical and innovative thought of the republic--should be the initiators of creating an organ to coordinate the work of the intersectorial innovative firm and of taking active part in its work?

I was unable to get a comprehensive answer neither here nor there to the question of why such initiative has as yet not been shown. I have gotten the impression that these respectable republic councils have recently become cool to their brainchild. Has it fallen under the guardianship of local industry? Well, this means less worry for us. And for the managers of Minmestprom such a position of nonintervention, as we can see, is also advantageous. And so the intersectorial buro is pulled ever tighter into the departmental harness, to the detriment of the interests of the common cause and the interests of scientific-technical progress.

SCIENCE AND TECHNOLOGY POLICY

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ANALYSIS, ASSESSMENT OF RESEARCH AT MEDICAL INSTITUTES MADE

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 6, Jun 85 pp 39-45

[Article by T. V. Zhuravleva, A. B. Doktorovich and A. P. Abramchenkov, Second Moscow Medical Institute imeni N. I. Pirogov and the Republic Information-Computer Center of the RSFSR Ministry of Health (Moscow): "The Method of the Analysis and Assessment of the Activeness of the Work of Scientific Research Institutes"]

[Text] At the present stage of the development of the system of health care among the multidimensional, urgent and practically important problems of improving the management of scientific research in the sector the problem of the analysis and comprehensive assessment of the activity of medical scientific research and developing institutions, organizations (scientific research centers) and higher educational institutions is of considerable interest.

The proper organization, the strict formal substantiation and the development of an adequate body of mathematics for the solution of this problem are of theoretical interest, while the results of its solution are practically important for the organs of the health care system, which carry out the planning, management and coordination of scientific research and long-range development.

In our opinion, the evaluation of the work of medical scientific research institutions and higher educational institutions should not be expressed only in economic indicators. By the efficiency of the work of one medical institution or another we understand the achievement during the planned period of the goals set for the institution with the minimum expenditure of the allocated resources. The concept of the scientific activeness of the collective, which was introduced by Yu. P. Lisitsyn, can be used as one of the important criteria of the evaluation of the activity of the objects being studied. In this work we formalize this concept in terms of generalized (aggregated) indicators, which characterize such types of scientific activity as the introduction of the results of completed scientific research and experimental design work in practical health care, the national economy and medical science, the generation of scientific information and the training of highly skilled scientists and teachers.

The calculated quantitative values of the generalized indicators make it possible to obtain strict assessments of each individual type of activity and all the activity as a whole and to evaluate the scientific activeness and orientation of the themes of the objects in question.

## I. The Formal Description of the Objects Being Studied

By regarding any scientific research institutions, higher educational institutions or their basic structural subdivisions as objects of planning and administrative management, it is possible to distinguish a number of so-called primary indicators which characterize such objects. A sufficiently complete set of primary indicators, which have been obtained from the corresponding planning and financial, technical, personnel and reporting documents, makes it possible to describe formally the objects being studied. Let us cite as examples of such primary indicators the following ones: the number of proposals for introduction, which were submitted in accordance with the results of doctoral dissertations, inventions and so forth; the number of published monographs, textbooks, atlases and papers given at international, all-union and republic conferences and so forth, the number of doctoral and candidate dissertations, which have been defended or have been submitted for defense.

A complete list of the primary indicators used by us is cited in Table 1.

Table 1

Primary and Generalized Indicators of the Objects Being Studied  
(on a scale of 1-100)

| Generalized indicators | No  | Primary indicators                            | Index of significance of type of scientific output (for 1981) |
|------------------------|-----|---|---|
| Group A <sub>1</sub> : |     | According to the results of:                  |   |
| proposals for          | 1.1 | doctoral dissertations                        | 8.66  |
| introduction           | 1.2 | inventions                                    | 8.22  |
|                        | 1.3 | sectorial efficiency                          |   |
|                        |     | proposals                                     | 4.90  |
|                        | 1.4 | candidate dissertations                       | 1.77  |
|                        | 1.5 | reports on scientific research work           | 0.09  |
| Group A <sub>2</sub> : |     |   |   |
| generation of          | 2.1 | Monographs, textbooks, atlases                | 48.72   |
| scientific information | 2.2 | Analytical surveys                            | 13.48   |
|                        | 2.3 | Foreign publications                          | 9.41  |
|                        | 2.4 | International papers                          | 5.72  |
|                        | 2.5 | All-union papers                              | 0.98  |
|                        | 2.6 | Republic papers                               | 0.36  |
|                        | 2.7 | Articles in journals                          | 0.39  |
|                        | 2.8 | Papers at scientific societies                | 0.31  |
|                        | 2.9 | Articles in collections                       | 0.07  |
| Group A <sub>3</sub> : |     |   |   |
| skilled                | 3.1 | Defended doctoral dissertations               | 100.00  |
| works                  | 3.2 | Defended candidate dissertations              | 18.11   |
|                        | 3.3 | Doctoral dissertations submitted for defense  | 16.05   |
|                        | 3.4 | Candidate dissertations submitted for defense | 0.22  |

Definition 1. We will call the ordered set of values of the primary indicators, which characterize the scientific research institution or its basic structural subdivisions, the object being studied  $O_i$ .

In the subsequent presentation the primary indicators, which define the object being studied, will be called the attributes of the object.

For the designation of the permissible values of attribute  $j$  we will use the symbols  $x_j$ , while we will designate the ordered set of permissible values of the attributes, which defines the objects being studied, by the symbol  $O_i$ . By definition 1, each object being studied  $O_i$  is given by the ordered set  $(x_{i1}, \dots, x_{in})$  of values of the attributes  $x_{ij}$ .

In this work, in setting ourselves the goal of determining the scientific activeness of the collectives of the scientific research institutions of the sector, we used three documents: the thematic card (TK), the reporting card (OK) and the plan of the introduction (PV) of the results of completed scientific research work (NIR).

Thus, in this work the formal description of the scientific research institution or its basic structural subdivisions as objects of planning and administrative management is given by the ordered set of the values of the primary indicators, which are listed in Table 1.

## II. The Generalized (Aggregated) Indicators of the Activity of Scientific Research Institutions

On the basis of the analysis made by us of 70 scientific research institutes and laboratories of the RSFSR Ministry of Health we distinguished three groups of primary indicators which characterize the activeness of the scientific production activity of these institutions. The following types of activity of the objects being studied were taken as the criterion of classification of the indicators being grouped: the introduction of the results of scientific research work and development in practical health care, the national economy and medical science ( $A_1$ ); scientific information ( $A_2$ ); the training of scientists ( $A_3$ ).

The primary indicators, which were grouped in conformity with the indicated types of scientific production activity of the objects being studied, are presented in Table 1.

The principle of the aggregation of the primary indicators into generalized indicators consists in the following.

1.  $p$  groups (in this work  $p=3$ ) of primary indicators (attributes of the objects), which correspond to the types of scientific production activity in question, are distinguished (see Table 1):  $A_1$ --proposals for the introduction in practice of the results of completed scientific research work;  $A_2$ --the generation of scientific information;  $A_3$ --the completion of skilled works.

2. For each group  $q$  of attributes  $J(q) = j_1, \dots, j_q$  there are determined:  
 $\sum_{i=1}^n x_{ij} = S_j$  is the quantity of output of type  $j$ , which was produced by all  $n$  objects;  
 $\sum_{j \in J(q)} S_j = \sum_q$  is the quantity of output of all types of group  $q$  ( $j \in J(q)$ ), which was produced by all  $n$  objects;  
 $\frac{S_j}{\sum_q} = \nu_j$  is the frequency of the appearance of type  $j$  of output (2.1).

3. The function of the significance of the type of output is determined. The non-negative monotonous function  $c_j = c(\nu_j)$ , the values of which characterize the relative significance of type  $j$  of output in group  $q$ , is chosen as such a function.

It is natural to assume that the relative significance of the attributes  $c_j$  should be non-negative and should belong to segment  $[0, b]$ , in which the boundary value  $b$  in each specific problem can be chosen as any one ( $0 < b < \infty$ ), which is convenient for the researcher.

In conformity with this assumption the boundary values of the function  $c(\nu_j)$  are determined by the relation:

$$c(\nu_j) = \begin{cases} 0, & \text{if } \nu_j = 1 \\ b, & \text{if } \nu_j = \frac{1}{\sum_q} \end{cases} \quad (2.2)$$

In our work when choosing the function  $c(\nu_j)$  the assumption that the more rarely encountered types of output are more significant in each group, is essential. The latter signifies that the lower the frequency  $\nu_j$  is, the more significant the output of type  $j$  in group  $q$  of attributes is.

When examining the set of logarithmic functions, it is easy to be convinced that it is possible to distinguish in it functions which fit the formulated properties of the function  $c(\nu_j)$ , which defines the relative significance of the individual types of output in each of the groups.

In general any function, which is given as the relation  $A \log_a \nu_j$ , where  $a > 0$ ,  $A < 0$  (taking into account that  $\nu_j \leq 1$ ), has such properties and in case of the corresponding choice of  $A$  and  $a$  satisfies the indicated requirements.

In this work we determine the function of the significance of the type of output by the relation:

$$c(\nu_j) = - \frac{b}{\lg \sum_q} \lg \nu_j \quad (2.3)$$

with the set of values  $(0, b)$  and assume  $b = 100$ .

It is easy to be convinced that this function has all the necessary properties and satisfies all the indicated requirements, including the boundary conditions (2.2).

The solution of the problem of determining the relative significance of the attributes in each individual group affords the possibility of their aggregation into generalized indicators.

4. The generalized indicators are determined for each object being studied  $O_i$ :

$$A_q(O_i) = \sum_{j \in J(q)} c_j x_{ij}, \quad (2.4)$$

where  $c_j = c(V_j)/S_j$  (2.5) is the index of the significance of type  $j$  of scientific output of group  $q$ .

From relation (2.5) it is evident that the index  $c_j$  defines the relative significance of a unit of scientific output of type  $j$  in the given group  $q$ .

The values of the index of significance of each type of scientific output, which were calculated for 70 scientific research institutions of the RSFSR Ministry of Health according to the data of 1981, are cited in Table 1.

### III. The Calculation of the Generalized Indicators

After the function of significance of the type of output is determined and the indices  $c_j$  of a unit of output in each of the  $p$  groups of attributes, which define the objects being studied, are calculated, the problem of calculating the generalized indicators  $A_q$  reduces to the simple arithmetic calculation of the relations (2.4).

As an example let us examine the Sverdlovsk Scientific Research Institute of Labor Hygiene and Occupational Diseases, which is defined by the following set of primary indicators:  $O_4 = (x_{41}, x_{42}, \dots, x_{418}) = (2, 0, 0, 5, 30, 0, 0, 0, 0, 2, 7, 1, 5, 17, 0, 0, 0, 6)$ .

1. The calculation of  $A_1$ --the generalized indicator which defines the generalized significance of the proposals for the practical introduction of the results of completed scientific research work.  $A_1$  aggregates the attributes of group 1  $J(1) = \{1.1, 1.2, \dots, 1.5\}$ .

$$A_1 = \sum_{j=1.1}^{1.5} c_j x_{4j} = 8.66 \cdot 2 + 8.22 \cdot 0 + 4.90 \cdot 0 + 1.77 \cdot 5 + 0.09 \cdot 30 = 28.85$$

The values of the indices  $c_{1.1}, \dots, c_{1.5}$  are indicated in the first five rows of Table 1.

2. The calculation of  $A_2$ --the generalized indicator which defines the generalized significance of the generation of new scientific information, aggregates the attributes of group 2  $J(2) = \{2.1, 2.2, \dots, 2.9\}$ .



$$A_2 = \sum_{j=2.1}^{2.9} c_j x_{4j} = 48.72 \cdot 0 + 13.48 \cdot 0 + 9.41 \cdot 0 + 5.72 \cdot 0 + 0.98 \cdot 2 + 0.36 \cdot 7 + 0.39 \cdot 1 + 0.31 \cdot 5 + 0.07 \cdot 17 = 7.56.$$

The values of the indices  $c_{2.1}, \dots, c_{2.9}$  are indicated in rows 2.1-2.9 of Table 1.

3. The calculation of  $A_3$ --the generalized indicator which defines the generalized significance of skilled works. This generalized indicators aggregates the attributes of group 3  $J(3) = \{3.1, \dots, 3.4\}$ .

$$A_3 = \sum_{j=3.1}^{3.4} c_j x_{4j} = 100 \cdot 0 + 18.11 \cdot 0 + 16.05 \cdot 0 + 0.22 \cdot 6 = 1.32$$

The values of the indices  $c_{3.1}, \dots, c_{3.4}$  are indicated in rows 3.1-3.4 of Table 1.

The values of the generalized indicators  $A_1$ ,  $A_2$  and  $A_3$  for 1981, which were calculated for several objects of study, are cited in Table 2.

Table 2

Generalized Indicators of Objects

| Object  | Generalized indicators |       |       |
|---|------------------------|-------|-------|
|   | $A_1$                  | $A_2$ | $A_3$ |
| Moscow Scientific Research Institute of Psychiatry                                  | 54.9                   | 490.9 | 0.7   |
| Leningrad Scientific Research Institute of Psychoneurology                          | 1.9                    | 144.0 | 1.3   |
| Moscow Scientific Research Institute of Hygiene                                     | 195.1                  | 53.2  | 0.7   |
| Sverdlovsk Scientific Research Institute of Labor Hygiene and Occupational Diseases | 28.8                   | 7.6   | 1.3   |
| Khabarovsk Scientific Research Institute of Epidemiology and Microbiology           | 69.3                   | 61.4  | 0.4   |
| Gorki Scientific Research Institute of Epidemiology and Microbiology                | 6.1                    | 10.5  | 0.7   |
| Moscow Oblast Scientific Research Institute of Clinical Medicine                    | 40.8                   | 39.3  | 363.1 |
| Moscow City Scientific Research Institute of First Aid                              | 61.5                   | 16.7  | 210.7 |
| Leningrad Scientific Research Institute of Ear, Throat, Nose and Speech             | 10.8                   | 18.3  | 28.3  |
| Rostov Scientific Research Institute of Obstetrics and Pediatrics                   | 0.3                    | 1.0   | 1.0   |

#### IV. The Classification of Objects in the Space of Generalized Indicators

The assessment of the activeness of the scientific production activity of the objects being studied in the space of their generalized indicators  $A_1$ ,  $A_2$ ,  $A_3$

and the establishment of the direction of the activity of the objects were carried out by us on the basis of the  $\varphi$ -method of cluster analysis, which was described in the work of A. B. Doktorovich and A. P. Abramchenkov.<sup>1</sup>

After the calculation of the generalized indicators each object being studied  $O_i$  can be defined by an ordered set of their values:  $O_i = (A_1^i, A_2^i, A_3^i)$ . Consequently, in the space of the generalized indicators it is a three-dimensional point, while its radius vector  $\vec{A}_i$ , which is drawn from the origin of the coordinates to this point, defines both the magnitude of the activeness of the scientific production activity of this object and its direction. The latter signifies that in space  $A$  in question the angle between the direction of the radius vector  $\vec{A}_i$  and the  $q$  coordinate axis  $A_q$  characterizes the direction of the scientific production activity of the given object toward its type  $q$ .

In the work, which is devoted to the  $\varphi$ -method of cluster analysis, it is shown that the direction of the scientific production activity of object  $O_i$  toward its type  $q$  can be assessed by the function  $\cos \alpha_q^i$ , where  $\alpha_q^i$  is the angle between  $\vec{A}_i$  and  $\vec{A}_q$ . In reality, given the value of the angle  $\alpha_q^i = 0$  the direction of the radius vector  $\vec{A}_i$  coincides with the direction  $\vec{A}_q$  of the coordinate axis, and the activeness of the given object in the production of output of those types, which determine the generalized indicator  $A_q$ , is the maximum. Here the cosine of the angle assumes the highest value:  $\cos 0 = 1$ . Given the value of the angle  $\alpha_q^i = 90^\circ$  the activeness of the activity of the object in this direction reduces to zero, while the cosine of the angle assumes a zero value:  $\cos 90^\circ = 0$ .

Taking into account that for each object  $O_i = (A_1^i, A_2^i, A_3^i)$  the identity:

$$A_i^2 = (A_1^i)^2 + (A_2^i)^2 + (A_3^i)^2 \quad (4.7)$$

is correct, it is possible to evaluate the contribution of each individual type of activity  $a_q^i$  to the magnitude of the overall activeness of the given object according to the formula:

$$a_q^i = \frac{(A_q^i)^2}{A_i^2} \cdot 100\%. \quad (4.8)$$

The characterization of the activeness and types of scientific production activity of several scientific research institutions of the RSFSR Ministry of Health during 1981 is presented in Table 3.

In our opinion, with respect to the activeness of scientific production activity it is possible to compare objects which are similar in the direction of the activity. Objects, which differ significantly in the direction of activity ( $\varphi(\vec{A}_i, \vec{A}_k) > \varphi_0$ ), cannot be compared.

1. VOPROSY RADIOELEKTRONIKA, SERIYA "AVTOMATIZIROVANNYYE SYSTEMY UPRAVLENIYA PROIZVODSTVOM I RAZRABOTKAMI", No 4, 1983, pp 17-24.

Table 3

## A Group of Similar Objects

| Number of groups | Object  | Type of activity        |   |  |                    |
|------------------|---|-------------------------|---|--|--------------------|
|                  |   | Indicator of activeness | introduction of results of scientific research work | generation of new scientific information | skilled works      |
|                  |   | absolute                | A <sub>1</sub> , %                                  | A <sub>2</sub> , %                       | A <sub>3</sub> , % |
| 1                | Moscow Scientific Research Institute of Psychiatry                                  | 494.0                   |   |  |                    |
|                  | Leningrad Scientific Research Institute of Psychoneurology                          | 143.9                   | 3.34  | 96.32                                    | 0.34               |
| 2                | Moscow Scientific Research Institute of Hygiene                                     | 202.2                   |   |  |                    |
|                  | Sverdlovsk Scientific Research Institute of Labor Hygiene and Occupational Diseases | 29.8                    | 97.23   | 2.73                                     | 0.04               |
| 3                | Khabarovsk Scientific Research Institute of Epidemiology and Microbiology           | 92.5                    |   |  |                    |
|                  | Gorkiy Scientific Research Institute of Epidemiology and Microbiology               | 12.2                    | 37.87   | 62.0                                     | 0.13               |
| 4                | Moscow Oblast Scientific Research Institute of Clinical Medicine                    | 367.5                   |   |  |                    |
|                  | Moscow City Scientific Research Institute of First Aid                              | 220.1                   | 3.56  | 1.32                                     | 95.12              |
| 5                | Leningrad Scientific Research Institute of Ear, Throat, Nose                        | 35.4                    |   |  |                    |
|                  | Rostov Scientific Research Institute of Obstetrics and Pediatrics                   | 1.5                     | 6.18  | 35.62                                    | 58.20              |

Definition 2. We will call the objects  $O_i$  and  $O_k$  similar in the direction of scientific production activity, if the angle  $\varphi(\vec{A}_i, \vec{A}_k)$  between the corresponding radius vectors of these objects does not exceed the given threshold value  $\varphi_0$ :  $\varphi(\vec{A}_i, \vec{A}_k) \leq \varphi_0$ .

Let us direct attention to two essential assumptions in case of the formation of groups of similar objects.

1. The grouping of objects, which are similar in their direction in the space of the generalized indicators, should be carried out in accordance with the maximum density of similarly directed vectors within the limits of the permissible value of the threshold angle. This means that preference is given to the group with the largest number of objects which are included in it.

2. In case of the formation of groups, which contain an equal number of objects being classified, but are characterized by different solid angles  $\phi_i$  and  $\phi_j$ , a group, which is determined by the smallest value of the solid angle, is distinguished.

The indicated assumptions are used when forming groups of comparable objects, that is, such groups, in which any two objects are similar in the sense of definition 2.

In each group, which has been distinguished in this way, the objects differ only in the magnitude of the activeness of their scientific production activity, which in this work is defined as the value of the modulus of the radius vector  $A_i$ :

$$|A_i| = \sqrt{(A_1^i)^2 + (A_2^i)^2 + (A_3^i)^2}$$

The values of the indicator of the activeness of the scientific production activity of several scientific research institutions of the RSFSR Ministry of Health for 1981 are cited as an example in Table 3.

In conclusion let us note that the proposed method of the analysis and assessment of the activeness of the scientific production activity of collectives can be applied not only to scientific research institutions, but also to developing organizations, higher educational institutions and their basic structural subdivisions.

It is possible to group with the advantages of the method the possibility of obtaining a quantitative evaluation of both each individual type of scientific production activity of the object and the activeness of its activity as a whole.

A method of determining the index of the relative significance of a unit of a type of output has been proposed. The determination of the index of relative significance is based not on expert assessments, but on the heuristic method which has been adopted by the majority of researchers.

In the work it is noted that in general not any pair of objects being studied is comparable. As a result of the performed classification groups of objects, which are similar in the direction of their scientific production activity, were distinguished, which makes it possible to make a comparison of such objects within each group.

The analysis and quantitative evaluation of the scientific production activity of 10 scientific research institutions of the RSFSR Ministry of Health, which were carried out on the basis of the proposed method, yielded results which correlate well with the expert assessments of these objects.

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## BUDGET AND FINANCE

### COST ACCOUNTING IN ACCELERATION OF TECHNICAL PROGRESS

Moscow DENG I KREDIT in Russian No 7, Jul 85 pp 40-42

[Article by R. I. Baranov, chief of the Quality Control Bureau of the Krasilov Standard Unit Plant: "The Role of Cost Accounting in the Acceleration of Technical Progress"]

[Text] The acceleration of scientific and technical progress is the cardinal problem of the present stage of the development of the national economy of the country. The effective action of economic stimuli so that all the production operations of enterprises and organizations would take place directly under the conditions of the continuous updating of production, is an important factor of the acceleration of scientific and technical progress. Here a large role belongs to the cost accounting system of the organization of operations on the development, assimilation and introduction of new equipment. The experience of the work of a number of sectors of industry, in which the indicator of the economic impact from the introduction of scientific and technical measures and standards of the formation of the unified fund for the development of science and technology are being used extensively, a set of incentive markups on the wholesale price for new highly efficient products is in effect and so on, attests, in particular, to this.

At the same time the advantages of this system of the planning and stimulation of new equipment have not yet fully revealed themselves. Enterprises and associations do not always properly take into account in the plans all the possibilities of the increase of the scientific and technical level of production and products with the simultaneous decrease of material, labor and financial expenditures.

Depending on the level of equipment and technology at the enterprise, the scale of production and other factors the amounts of the material and labor expenditures with respect to many types of products have significant deviations. Thus, at several enterprises of ferrous metallurgy depending on the volumes of production of iron castings the expenditures on the production of similar types of products differ on the average by 1.7-fold and depending on the level of equipment and technology by 2.3-fold.<sup>1</sup>

This is connected to a certain degree with the fact that the level of expenditures is frequently established without adequate technical and economic

substantiation, the assignments on the decrease of the rates of consumption of raw materials and materials are not always coordinated with the plan of the development of new equipment. These assignments at times are established for enterprises without consideration for their specific nature, the evaluation of the work of production collectives concludes with the comparison of the actual economic indicators with the planned indicators. The latter are formed on the basis of either individual or average sectorial norms of expenditures, while the mean indicator of the individual expenditures acts as the criterion.

Under these conditions, in our opinion, the question of the evaluation of the production activity of enterprises on the basis of reference standards and the organization on this basis of the economic stimulation of the introduction of new equipment merits attention. The time of the implementation of scientific and technical achievements should also be standardized, while the observance of these standards should be taken into account in case of the evaluation of the work of production units and their material stimulation. With allowance made for the rate of technical progress it is possible to elaborate these standards by years of the five-year plan in the form of a scale. In this case the graduated standards will be long-term standards, which is very important under the conditions of the introduction of standards of the net output and the wage.

At the present stage the role of cost accounting and the strengthening of its stimulating role in increasing production efficiency on the basis of technical progress are growing. It is very important that all the participants in the "research--production" cycle, including the carrying out of scientific research work, applied development, the preparation and assimilation of the production of new equipment and technology, would actually be interested materially and morally both in the shortening of this cycle and in the rapid organization of the output of highly efficient products for production engineering purposes and consumer goods. The gradual changeover of scientific research, design and technological organizations to the system of settlements for work, which has been completely finished and has been accepted by the client, would contribute in many ways to the successful solution of this problem.

The special-purpose nature of the elaboration and implementation of measures on the acceleration of scientific and technical progress is posing the tasks of the establishment of multiple-skill applied science brigades, which are called upon to insure the implementation of completed scientific research. It is expedient to increase the economic responsibility of scientific research and design subdivisions before the client for the quality of the developments carried out by them and to insure the reimbursement of the clients on the part of scientific research institutes and design bureaus, as well as technological subdivisions for the harm, which occurred as a result of the low-quality performance of the work, deviation from the specifications, the upsetting of the deadlines of the performance of the work (as against those established in the contracts) and others.

At present the financial mechanism is not yet having the proper influence on the shortening of the time of the conducting of scientific and technical development. This is leading to an increase of unfinished amounts of work at

scientific organizations as compared with the amounts of fulfilled themes. Thus, in the Ministry of Machine Building for Light and Food Industry and Household Appliances the unfinished work at the end of 1982 came to 117.9 million rubles, or exceeded by 25.4 percent the amount of scientific research, planning and design and technological work and by 44 percent the amount of work performed on its own. On the average for the Ministry of Machine Building for Light and Food Industry and Household Appliances 5-7 years, and in individual cases up to 10 years pass from the development of a scientific and technical solution to the series production of machines.<sup>2</sup>

It is possible to divide into two groups all the sources of financing of scientific and technical progress at production associations with allowance made for the principles of their cost accounting organization. The unified fund for the development of science and technology, which is completely centralized at the level of sectorial ministries, as well as the budget allocations for the financing of important scientific research work are assigned to the first group. These two sources at many associations make up more than two-thirds of the total amount of financial resources, which are being channeled into the financing of the development of science and technology at production associations and at the scientific research institutes, planning and design and technological organizations and other subdivisions, which belong to them.

The production development fund, the receipts of assets in accordance with economic contracts, the expenditures on inventing and efficiency promotion, as well as bank credit are included in the second group of sources of the financing of scientific and technical progress at production associations.

In conformity with the prevailing statute the unified fund for the development of science and technology is formed by means of deductions from the planned profit of enterprises and a portion of the additional profit (the amount of the incentive markups on wholesale prices) from the sale of new highly efficient products and products with the State Emblem of Quality. The latter is of great importance, since the formation of the fund takes place by means of a portion of the national economic impact which is realized in the form of the additional profit from the incentive markups on wholesale prices, which is aimed at strengthening the connection of the fund with the end results of the activity of the sectors on the implementation of highly efficient scientific and technical measures.

The manufacturing enterprises of new equipment receive a portion of the economic impact in the national economy from its use in the form of an incentive markup on the wholesale price for efficiency and quality, the amount of which depends on the ratio between the economic impact and the wholesale price. The stimulation of the production of highly efficient products is one of the basic functions of the unified fund for the development of science and technology.

However, the prevailing procedure of forming the unified fund for the development of science and technology, in our opinion, does not yet guarantee a sufficiently close dependence between the degree of participation of the enterprise in technical progress and the amount of the financial contributions

to the unified fund for the development of science and technology. The calculations of the amount of assets, which enterprises contribute from the profit to the unified fund, are not always supported by scientifically sound methods and in practice often do not insure a stable economic interest of industrial enterprises in the systematic increase of the technical level of production on the basis of the output of new types of equipment. The contributions to this fund from the profit are planned not with respect to all enterprises, but only with respect to individual ones, which operate stably and profitably. Thus, in the plan for 1983 deductions for the unified fund for the development of science and technology were not envisaged for the Kishinev Plant of Food Equipment, although expenditures on new equipment were planned in the amount of 500,000 rubles. At the Krasilovsk Machine Building Plant the deductions for the unified fund for the development of science and technology in the plan for 1983 exceeded by more than twofold the amount of expenditures on new equipment.

In this connection the question of increasing the economic soundness of the standards of the deductions from the profit for the indicated fund also merits attention. The experience of the work of production associations of power machine building and agricultural machine building on the use of differentiated standards of the deductions of enterprises and associations for the unified fund with allowance made for their profit and profitability of production confirms the advisability of their use at other associations as well.

It seems economically justified to us when determining the standard of the deductions from the profit of associations and enterprises for the unified fund to take into account without fail the total amount of the profit and the achieved level of profitability, the degree of the participation of associations and enterprises in the fulfillment of the plan on the volume, the difficulty and the quality of the scientific and technical development of the subsector and sector. Production associations and enterprises, which have achieved a high proportion in the total production volume of products with the State Emblem of Quality, other conditions being equal, should have additional advantages in case of the determination of the standard of deductions from the profit for the unified fund for the development of science and technology of the sector. This, undoubtedly, will stimulate more actively the further improvement of their production operations and financial activity by increasing the creative activeness of the collectives.

It is also advisable in the future to broaden and extend the cost accounting principle when carrying out the financing of expenditures on new equipment. For this with allowance made for the sectorial long-range and current plans of scientific and technical development at production associations and enterprises one should establish at the expense of the profit cost accounting funds for the development of science and technology in such amounts that they would guarantee the established amount of scientific research work and individual design developments, as well as the assignments on inventions and efficiency proposals.

The improvement of the cost accounting financing of work on scientific and technical progress presumes, thus, first of all a change of the procedure of



forming the unified fund for the development of science and technology in the direction of the greater coordination of the planned amounts of financial assets with the qualitative characteristics of the output being produced, as well as a change of its use on the basis of the standardized breakdown of assets by directions of the operations of the scientific and technical cycle. The introduction of standards of the distribution of the assets of the unified fund for the development of science and technology to some degree can limit the possibilities of sectors in the free shifting of its assets, but at the same time it will contribute to the goal-oriented use of the allocated financial resources for specific themes, scientific and technical developments and projects, which are oriented toward high end national economic results.

The question of introducing in the prevailing methods the indicator of the actual impact of the prototypes (production models) merits attention. On its basis one should establish the markups on prices and carry out material stimulation for the development and introduction of new equipment in the form of an advance. In case of a deviation of the actual impact from the demonstrated impact by more than 10-15 percent after several years of use of the equipment it is necessary to envisage economic sanctions. If this is due to design shortcomings and shortcomings in the production of the equipment, the producer (including the developers) should be deprived of the markup on the price for new equipment, which is subject to transfer to the user with the corresponding recalculation of the economic stimulation funds. If this happens due to the unsatisfactory use of the new equipment, the user should be deprived of the bonus for its introduction.

At present the workers of enterprises are paid bonuses mainly for the achieved overall result: for the fulfillment of the production plan--from the material incentive fund, for new equipment--from the special goal fund, which is very negligible. The payment of bonuses from these sources is carried out autonomously, which, in our opinion, does not conform to the present conditions if only because it undermines the unity of the "production--new equipment" cycle.

In our opinion, it is necessary to stimulate personnel, especially management personnel, first of all on the basis of what real impact the new equipment gives and how it influences the end results of production. For this it is necessary to unite the fund for the payment of bonuses for new equipment with the material incentive fund, to adjust the amount of deductions for this fund according to the prevailing indicators depending on the level of fulfillment of the plans on technical development and to increase it in proportion to the impact which is obtained by enterprises from the use of scientific and technical achievements in production.

#### FOOTNOTES

1. See T. Khachaturov, "The Economic Prerequisites of the Management of Scientific and Technical Progress," VOPROSY EKONOMIKI, No 4, 1983.

2. See Ye. A. Lavrentyeva, "The Cost Accounting Financing of New Equipment,"  
VOPROSY EKONOMIKI, No 4, 1984.

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## FACILITIES AND MANPOWER

### SCIENTIFIC, TECHNICAL INFORMATION BUREAU OF STATE BANK BOARD

Moscow DENG I KREDIT in Russian No 7, Jul 85 pp 44-50

[Article by A. A. Tikhonova, chief of the Scientific and Technical Information Bureau attached to the Board of the State Bank, and V. Ya. Ivanov, chief of a division of the Scientific and Technical Information Bureau: "Information Service"]

[Text] More than 100,000 titles of books and more than 50,000 journals are published annually in the world. Each year the output of printed text increases by approximately 7 billion pages. World statistics established that the total amount of publications doubles approximately every 10 years.

The increasing amount of scientific and technical information is creating significant difficulties in the retrieval and selection of the necessary information, on which scientists and specialists have to spend up to 30-40 percent of their time.

The problem of retrieving the necessary scientific, technical and economic information is an independent national economic problem, the solution of which has been assigned to the State System of Scientific and Technical Information (GSNTI), which was formed during the 1960's and 1970's.

Decree No 916 of the USSR Council of Ministers of 29 November 1966, "On the Statewide System of Scientific and Technical Information," which specified the functions, tasks and subordination of scientific and technical information organs, was of great importance in the formation of this system.

Particular attention in this decree was directed to the development of information systems in the sectors of the national economy of the country and to the assurance of the joint activity of information organs and scientific and technical libraries on the basis of information-reference collections.

The following principles were the basis for the formation of the State System of Scientific and Technical Information: the specialized processing of primary documents (sources) at all-union and central sectorial scientific and technical information organs in conformity with their specialization; a unified system of information supply on the basis of the interconnected reference collections of scientific and technical libraries and scientific and technical information organs.

In the USSR State Bank for many years the scientific and technical library, which is the same age as the bank, performed a portion of the information work. However, the library was not able to make available to specialists all the diversity of information services, which are provided by the modern system of scientific and technical information, as well as to fulfill the tasks of the central scientific and technical information organ in the system of the bank.

The organizational work on the establishment of the Scientific and Technical Information Bureau attached to the Board of the State Bank was carried out in two directions. On the one hand, the principles of the organization of scientific and technical information and the questions of the theory and practice of information supply were studied and, on the other, the activity of the subdivisions of the central system, as well as the organizations and institutions of the system of the State Bank was studied for the purpose of identifying their peculiarities as users of information.

The information needs of specialists of the bank and organizational and other questions had been studied by the start of the activity of the Scientific and Technical Information Bureau. The necessary sources of scientific and technical information were determined.

During the years of the formation of the bureau as the central scientific information organ in the system of the USSR State Bank, starting in October 1983, its structure, tasks and functions underwent great changes and received further development.

In the new Statute on the Scientific and Technical Information Bureau, which was approved on 29 June 1979, its functions were broadened significantly. The questions connected with the activity of the bureau as the central information organ of the bank, the questions of the organization and introduction in the practice of its work of advanced forms and methods of information supply, as well as the questions of the improvement of the information system of the USSR State Bank found reflection in this document.

A new structure of the Scientific and Technical Information Bureau, which completely conformed to the tasks and functions being fulfilled, was developed in accordance with the recommendations of the Scientific and Technical Information and Propaganda Administration of the USSR State Committee for Science and Technology. This structure is also in effect at present.

On 1 January 1985 93 percent of the specialists working in the bureau had a higher, incomplete higher and secondary specialized education. Among the specialists 32 percent know foreign languages and use this knowledge in their practical work. In all 47 percent of the staff members have a length of service at the Scientific and Technical Information Bureau of more than 5 years.

The information-reference collection of the Scientific and Technical Information Bureau, which is the aggregate of the systemized collection of domestic and foreign publications, information materials, standard technical specifications and other materials of scientific and technical information, as

well as the reference and information retrieval system for this collection, is the main base for the information supply of specialists of the system of the USSR State Bank.

The domestic and foreign literature on various questions of financial and banking work, which is needed by the bank specialists and in many ways is unique, is concentrated in the scientific and technical library of the bureau.

At the start of the establishment of the Scientific and Technical Information Bureau in 1973 the holdings of the scientific and technical library came to 99,793 copies. On 1 January 1985 these holdings numbered 123,875 copies, including 70,675 copies of books and pamphlets, 41,151 copies of domestic and 10,421 copies of foreign periodicals and serials; 9,901 copies of publications of information organs. In thematic composition the holdings of the scientific and technical library number 28,897 copies of sociopolitical literature and 70,488 copies of financial and economic literature.

The making up of the holdings of the scientific and technical library is carried out on the basis of the systematic study of the information needs of bank specialists and with their immediate participation.

In 1982-1983 a number of measures, which were aimed at the improvement of the acquisition of holdings, were implemented at the scientific and technical library. The receipt by the library of reports on foreign business trips, which were organized in accordance with the plan of scientific and technical cooperation, copies of dissertations, papers and reports on scientific research work, translations on bank themes and so on was organized. The copying of the most valuable literature is being carried out for supplementing the holdings with publications of past years.

On the average 120-130 titles of domestic and 150-160 titles of foreign periodicals and serials, including 30-40 titles of periodicals of socialist countries, annually enter the holdings of the scientific and technical library.

In 1983 the possibilities of obtaining copies of foreign journals on microcarriers from all-union and central sectorial scientific and technical information organs of the country were studied by the bureau for the purpose of enlarging the group of received foreign sources of scientific and technical information without the expenditure of additional currency assets.

As a result of the performed work in 1984 copies of 19 titles of journals at 7 scientific and technical information organs were subscribed to. Among them are such ones as the All-Union Institute of Scientific and Technical Information (VINITI), the Institute of Scientific Information on the Social Sciences (INION), the USSR State Public Scientific and Technical Library (GPNTB) and a number of others.

The reference and information retrieval system, which is a set of ordered files of secondary documents and is intended for the retrieval of scientific and technical information which satisfies the information needs and requests of specialists, is a component of the information-reference bank.

The reference and information retrieval system makes it possible to make a retrospective search for information materials in accordance with the requests of specialists of the system of the State Bank, to acquaint the users of the information with the sources in reduced form and thereby to shorten their time for becoming acquainted with the information and to make available information on primary documents, which are absent in the information-reference collection, but are of interest for the users of the information.

The reference and information retrieval system of the Scientific and Technical Information Bureau consists of an alphabetical and a classified catalog, a subject card file, bibliographical, thematic and auxiliary card files and the Main Reference Card File (GSK).

The total size of the reference and information retrieval system on 1 January 1985 came to 156,456 cards, including 14,665 cards in the Main Reference Card File.

The Main Reference Card File was established in 1974 and numbered 2,500 cards. At present the Main Reference Card File is the basis of the reference and information retrieval system of the holdings and is the most complete collection of secondary documents on banking themes and related fields of knowledge.

The card files of the All-Union Book Chamber, the abstract collections of the All-Union Institute of Scientific and Technical Information and the Institute of Scientific Information on the Social Sciences, bibliographical indices, journals of the socialist countries, unpublished documents, translations and others are the sources for making up the Main Reference Card File. About 500 titles of sources are processed annually for supplementing the Main Reference Card File. The Main Reference Card File consists of 14 sections which include more than 100 headings. Acquisition is carried out on the basis of the thematic and operational plans.

In addition to the information-reference collection of the Scientific and Technical Information Bureau in the system of the State Bank book collections have been accumulated at 7 technical libraries and 20 educational libraries of accounting and credit tekhnikums. The total collection of these libraries comes to about 1 million copies of publications of various types. More than 1 million copies of literature are loaned annually to nearly 35,000 readers from the information-reference collection of the Scientific and Technical Information Bureau and the collections of the technical libraries of offices of the State Bank and educational libraries of tekhnikums.

On the basis of the materials of the information-reference collection the Scientific and Technical Information Bureau carries out the information-reference supply of specialists of the system of the State Bank, as well as other enterprises and organizations in accordance with requests.

Along with the traditional forms of information-reference supply, such as library bibliographical service, service in the "question--answer" mode, translation activity and information publications, individualized methods of

getting information sources to the subscribers of the information system of the bank have developed and improved.

Library bibliographical service is carried out by the scientific and technical library of the Scientific and Technical Information Bureau. Specialists of the Board of the State Bank, the Foreign Trade Bank, the Main Computer Center, the Board of the State Workers' Savings Bank and others, in all more than 2,000 people, are readers of the scientific and technical library.

On the average in a year the scientific and technical library lends for use in the reading room and at home more than 35,000 books, journals and other types of publications. In all during the time of the existence of the Scientific and Technical Information Bureau the library has lent more than 400,000 different publications.

When the necessary literature is absent in the collection of the scientific and technical library, interlibrary lending (MBA) is used. From 1973 to 1983 the scientific and technical library received about 1,800 copies of literature through interlibrary lending from other libraries and lent more than 1,000 copies of literature through interlibrary lending in accordance with the requests of other libraries.

For the purpose of promoting the collection the scientific and technical library organizes thematic exhibitions, at which the works of the classics of Marxism-Leninism, documents of the party and government and the basic literature on the theme of the exhibition are displayed.

For acquainting the readers with acquisitions of literature the library organizes the permanent "New Books" and "New Journals" exhibitions and holds monthly in the reading room of the scientific and technical library a review of new literature. In all during the time of the work of the Scientific and Technical Information Bureau more than 300 exhibitions have been organized. The bureau is devoting much attention to information-reference service in the "question--answer" mode. This is such a method of the organization of information-reference work, in case of which a one-time response is prepared and issued for each received request for information. Information supply in the "question--answer" mode is of an individual and goal-oriented nature and has precision and relative simplicity in its accomplishment. Requests from the users of information are received for books, journals, articles, translations, author's abstracts, as well as for bibliographical references and so on. From 1973 to 1983 nearly 5,300 bibliographical and thematic references were prepared.

The bureau is using extensively in its work the method, which is convenient for the users of information, of copying articles from Soviet and foreign periodical sources on the basis of current awareness information and individual orders of management and specialists. On the average in a year 450-500 such orders are filled.

The making of translations of foreign sources of information is one of the traditional forms of information-reference supply. In 1974 a special subdivision of foreign information was established in the Scientific and

Technical Information Bureau. The specialists of this subdivision have performed much work on the identification of foreign sources of information on banking themes.

The specialists of the Scientific and Technical Information Bureau annually scan more than 1,500 foreign publications. During the scanning and processing of the received literature more than 1,200 materials are selected for the information of specialists of the State Bank and the Foreign Trade Bank. The search for the necessary information is being facilitated owing to the keeping by the workers of the bureau of a thematic card file of foreign information on currency, economic and banking issues, as well as the accumulation of files on various questions of international currency and credit relations.

Abstracts, annotations, bibliographical descriptions and reports are drawn up in accordance with the selected materials.

The materials, which have been processed in this manner, are used extensively in all types of information service. Specialists, in receiving information on foreign materials through various channels of information service, order at the Scientific and Technical Information Bureau translations of the materials which interested them. The translations are made by staff members of the Scientific and Technical Information Bureau, through the All-Union Center of Translations (VTsP) and by nonstaff translators.

During the time of the existence of the bureau in accordance with the orders of management and specialists of the system of the State Bank translations in the amount of more than 400 author's sheets have been made, including about 300 sheets from English, French and German by translators of the Scientific and Technical Information Bureau.

The survey and analytical work, which is being performed at the Scientific and Technical Information Bureau, holds a significant place in information supply. All the books, pamphlets, monographs, periodicals in Russian and foreign languages, standardized materials, dissertations, scientific reports and so on, which enter the information-reference collection, go through the synthetic analysis bureau.

The information materials, which are prepared as a result of this work, form a unified system on the basis of the unity of the themes, the used sources of information, the principles of organization and the style of designing, the group of users of the information and the methods of preparation.

Bibliographical, abstract and survey publications are the basic types of information publications. The information publications are prepared for bank specialists in limited number and only for internal use.

The Scientific and Technical Information Bureau began to carry out the preparation of publications for users of information starting in 1974. For the most part these were bibliographical indices, which were sent to the Board of State Bank, the Foreign Trade Bank, the Board of the State Workers' Savings Bank and the offices of the State Bank.



In 1982 a number of measures on the further improvement of information publications and the improvement of their quality were implemented, the preparation of publications of a higher level of complexity--abstract and survey publications--was begun.

At present the following publications are prepared by specialists of the Scientific and Technical Information Bureau.

#### Abstract Information

1. The series "The National Economy and the Bank" (six issues a year--six publisher's signatures). The series includes abstracts of articles of periodicals on the role of the bank in the national economy. In the issues attention is devoted to the experience of the work of banks of socialist countries.

2. Information on materials of the foreign press (10 publisher's sheets). The information is prepared on the basis of foreign periodicals.

3. New banking equipment abroad (two issues a year). The material of foreign periodicals and prospectuses of foreign firms, which cover the foreign experience of developing and using banking equipment, is used for the preparation of these issues.

#### Bibliographical Indices

1. New Soviet and foreign literature on questions of finance, credit, money circulation, the savings business and international currency and financial relations (four issues a year). The index contains information on the literature (books, pamphlets, dissertation abstracts, journal articles, reviews) on banking themes, which is published in the USSR and abroad. The material is arranged by thematic subsections.

2. The new literature received by the scientific and technical library (12 issues a year). The index contains bibliographical information on all the domestic publications received by the scientific and technical library. The materials are arranged by thematic sections. The library classification is the basis for the thematic subsections.

3. New books abroad (four issues a year). Information on books, which have been taken from the publications of foreign journals and from the abstract indices of the Institute of Scientific Information on the Social Sciences (INION) "Ekonomika. Novaya inostrannaya literatura po obshchestvennym naukam" [Economics. New Foreign Literature on the Social Sciences], on currency and financial issues and banking is cited in the index. Books on questions of international economic relations and theoretical studies on the role of money in the state regulation of the economy of both individual countries and the capitalist economic groups and books on the activity of the International Monetary Fund and the International Bank for Reconstruction and Development are also included.

## Current Awareness Information

1. On new domestic journals which have been added to the central information-reference collection (20 issues a year). In the issues a list of new journals received by the scientific and technical library is published and their content is cited.
2. Current awareness information by subscription for the next year (one issue a year). All the periodical literature, to which the scientific and technical library of the Scientific and Technical Information Bureau has subscribed for a year, is reflected in this issue.

## Survey Information

1. International financial and economic relations (two issues a year). An analytical survey of the foreign periodical literature on questions of the development of currency and economic relations and new phenomena in the international banking system is given in the issue.
2. The local press and the bank (two issues a year). The materials of the local press, which are devoted to various questions of the activity of the bank, are included in the issues of this survey.

Feedback plays an important role in the improvement of the information publications. The Scientific and Technical Information Bureau is performing work on the analysis of the use of its own publications by means of surveying and personal contacts with the users of the information, who in oral and written form express their opinions and wishes with respect to the improvement of the quality of information publications, the topicality of the questions examined in them and so on.

The preparation of information publications is carried out on the basis of the plans of the publications of information materials, which are drafted by the Scientific and Technical Information Bureau and in which the types and themes of publications, the number of issues a year, the size in publisher's sheets and the planned circulation are reflected.

Since 1983 for the purposes of the planning of the circulation and the saving of paper and the time of staff members the information publications of the Scientific and Technical Information Bureau have been disseminated only through subscription. For this a prospectus, in which all the types of publications of the Scientific and Technical Information Bureau and the procedure of making out a subscription are presented, is prepared and sent to users.

The system of the selective dissemination of information (IRI) is one of the promising forms of differentiated information supply. This system is contributing to the prompt delivery of secondary information on new primary materials to scientists and specialists in conformity with their information needs with constant feedback with scientific and technical information organs.

The basic goal of the system of the selective dissemination of information is the promotion of the constant maintenance of the knowledge of scientists and specialists at the present level. The information, which is needed by bank specialists, is retrieved from the flow of new acquisitions and is sent to them in the form of a current awareness announcement (an abstract, an annotation, a bibliographical description). The periodicity of the sending of the current awareness announcement is twice a month. The supply of the subscribers of the system of the selective dissemination of information is carried out through a two-circuit system: at the first stage the current awareness announcement is issued to the subscribers, while at the second stage the original or a copy of primary documents is issued to them.

The system of the selective dissemination of information in the Scientific and Technical Information Bureau began to be introduced in 1974-1975. Prior to 1979 35 collective subscribers, mainly subdivisions of the Board of the State Bank, which were supplied with copies of the primary sources on the basis of 50 standard requests, were supplied with information under the conditions of the selective dissemination of information.

The increased demands on the quality and efficiency of the work, which is performed in the system of the bank, also entailed an increase of the demands of management and specialists on the high-quality selection of information materials and on the purposefulness of information supply. This also served as the basic reason for the further improvement of the system of the selective dissemination of information.

In 1979 work was performed on the improvement of information supply under the conditions of the selective dissemination of information. In this work the Scientific and Technical Information Bureau used the gained experience of the organization and functioning of this system in a number of central sectorial scientific and technical information organs. The following work was performed: the requirements of subscribers were established, the information sources were specified, the information carrier was chosen, the technological conditions of the operation of the system were developed, the forms of the documents of the system were elaborated, the system of the accounting and monitoring of the work under the conditions of the selective dissemination of information was organized, functions were distributed among the subdivisions of the Scientific and Technical Information Bureau.

At present 90 individual subscribers are supplied with information under the conditions of the selective dissemination of information. Chiefs of administrations, their deputies, chiefs of departments, their deputies, leading specialists of practically all the basic structural subdivisions of the Board of the State Bank, as well as a number of managers and leading specialists of the Board of the State Workers' Savings Bank, the Main Computer Center, the Foreign Trade Bank, the Computer Center of the Foreign Trade Bank, the editorial office of the journal DENG I KREDIT, the multiple-user computer center of the Moscow City Office of the State Bank and others are included in this number.

The individual subscribers are provided with information materials of the selective dissemination of information in accordance with 20 thematic sections which unite 425 individual requests.

In 1980 a number of republic, oblast and city offices of the State Bank were accepted for information supply under the conditions of the selective dissemination of information in conformity with their 50 thematic requests. Among them are republic offices--the RSFSR, Azerbaijan, Belorussian, Ukrainian, Kazakh and Uzbek; oblast offices--Gorkiy and Lvov; city offices--Leningrad, Kiev and others.

The basic qualitative indicators of the work of the system of the selective dissemination of information are: the completeness and accuracy of the retrieval of the necessary information materials which correspond to the request of the subscriber; the structure of the ratings of information by subscribers and the share of ratings of "5" and "4" in the total number of ratings; the time of the preparation and delivery of current awareness information to subscribers, the time of the issuing of primary documents from the information-reference collection and the time of the preparation of the translations, which were sent to the subscriber through the system of the selective dissemination of information.

In 1981-1984 alone on the basis of the synthetic analysis of sources of information (periodicals and serials, books, pamphlets and so on) specialists of the bureau prepared for subscribers of the system of the selective dissemination of information about 4,000 current awareness announcements in more than 6,000 copies. The return of the feedback forms during these 4 years showed that 98 percent of the documents, which were selected for the subscribers of the selective dissemination of information, satisfied the requirements.

Documents, which received subscriber ratings of "5" and "4," that is, "very valuable" and "valuable" information, made up more than 60 percent of the total number of documents which satisfied the requirements.

At present nearly all the current acquisitions of the scientific and technical library have been incorporated in the system of the selective dissemination of information. Among them are: books, periodicals and serials of all-union publishing houses, bibliographical and abstract journals of all-union information organs, such as, for example, the All-Union Institute of Scientific and Technical Information, the Institute of Scientific Information on the Social Sciences, the State Public Scientific and Technical Library and others, as well as of sectorial information organs and periodicals and serials of foreign countries. In conformity with the list 129 domestic and foreign publications have been incorporated in the system of the selective dissemination of information.

The system of the selective dissemination of information is constantly being improved: the requests are being made more precise, the lists of periodicals and serials being processed are being enlarged, the accounting and monitoring of the passage of information materials through the system of the selective dissemination of information are being improved and others.

In 1982 in the Scientific and Technical Information Bureau the system of the individualized supply of management (DOR) was developed and began to be introduced in the practice of activity. The individualized supply of management is a system of the individual-oriented information supply of managers of various levels. In all 29 subscribers, to whom information materials are sent in accordance with 92 permanent requests, were accepted for information supply under the conditions of the individualized supply of management.

The information materials, which are prepared on the basis of the current acquisitions (periodicals and serials, books, pamphlets and so on) of domestic sources of information, are sent to the subscribers of the individualized supply of management in conformity with their themes twice a month in the form of copies of primary sources, abstracts, annotations and bibliographical descriptions; notification on publications in the Soviet central newspapers is carried out by telephone; rapid information, which is sent to subscribers no less often than twice a week, is prepared in accordance with the materials of foreign periodicals and newspapers.

The rapid information on materials of foreign sources reflects questions of the currency and economic status of individual industrially developed and developing states, the development of the international banking system, the payment problems of developing countries and others. On the average in a year 200 information documents on domestic sources of information and 100 rapid information reports on foreign sources are sent to the subscribers of the system of the individualized supply of management. Moreover, information materials on foreign sources of information in the form of copies of primary sources, translations, abstracts, annotations and reports are prepared during the year for the subscribers of the system.

Thus, the management personnel of the system of the State Bank are covered by nearly all the forms of information supply which is carried out by the Scientific and Technical Information Bureau: the individualized supply of management and the selective dissemination of information, "question--answer," library bibliographical service and others.

The establishment of a system of the information supply of management and specialists of the organizations and institutions of the system of the USSR State Bank was the basic result of the activity of the Scientific and Technical Information Bureau during the years which have passed since the day of its founding. The analysis of the activity of the Scientific and Technical Information Bureau over 10 years also made it possible to identify the unsolved problems and to specify the tasks on the further improvement of information supply.

Efficiency, purposefulness and the selectiveness of information should become the basis for the improvement of the quality and the increase of the efficiency of information supply. The work on the improvement of the information-reference collection and the reference and information retrieval system, the improvement of information supply on foreign sources of information, the increase of the number of subscribers of the system of the selective dissemination of information both in the central system and at the

offices of the State Bank and the establishment in the offices of the State Bank of public bureaus for scientific and technical information will be continued for the purpose of fulfilling these tasks. Additional steps have to be taken on the further improvement of information publications, the broadening of the service of users with information materials on microcarriers and the improvement of the procedural assistance to the educational libraries of accounting and credit tekhnikums and the libraries of the offices of the State Bank.

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## TRAINING AND EDUCATION

### SOCIALIST COMPETITION AT ECONOMICS INSTITUTE OF LATVIAN ACADEMY

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[Article by V. I. Kurenkova, Institute of Economics of the Latvian SSR Academy of Sciences: "The Organization and Development of Socialist Competition in Scientific Collectives"]

[Text] At the present stage of the socioeconomic development of our country socialist competition has become a most important factor of the acceleration of scientific and technical progress. In this connection the importance of socialist competition in science is increasing. A special situation with the development of socialist competition has formed at academic scientific institutions, where the need for competition is also governed by the important circumstance that academic science is the leader of scientific and technical progress, which sets the directions and pace of the elaboration and assimilation of new scientific and technical problems. In the past 15 years socialist competition in scientific collectives has been actively developed and improved, although prior to the end of the 1960's the question of the organization of socialist competition in science was of a debatable nature. Alluding to the peculiarities of scientific labor, some social scientists denied the possibility of organizing socialist competition in science, and practice did not provide examples of its extensive and efficient organization.

Nevertheless life itself confirmed Lenin's thesis that all spheres of social life without exception should be encompassed by competition, since V. I. Lenin believed that there is not one sphere of the economy and daily life, which is not the fruit of the creativity of the workers. At first mainly laboratories, sectors and divisions of one scientific research institute and one labor collective took part in socialist competition. Then competition between scientific institutions became widespread. The need to broaden competition between scientific research, planning and planning and design organizations was indicated in the decree of the CPSU Central Committee of 31 August 1971, "On the Further Improvement of the Organization of Socialist Competition."<sup>1</sup>

In 1974 the All-Union Socialist Competition of Collectives of Scientific Research, Planning and Design Organizations for the Successful Fulfillment of the Assignments of the National Economic Plan on the Most Important Scientific and Technical Problems was organized. The All-Union Socialist Competition of

Scientific Research, Planning and Design Organizations by Sectors was organized starting in 1975. The practice of organizing socialist competition was enriched during the past 10th and 11th Five-Year Plans.

Owing to development in breadth the competition in science in a short time has become massive and universal and is being conducted at every scientific research institute and design organization. Today the existing forms and types of competition are aimed more and more at the end, qualitative results. New forms of competition in science have emerged. The All-Union Socialist Competition of Collectives of Scientific Research, Planning, Technological and Design Organizations, Associations and Enterprises for the Successful Fulfillment of the Assignments of the Scientific and Technical Comprehensive Goal Programs and Programs on the Solution of the Most Important Scientific and Technical Problems for 1981-1985 is being developed.

On 10 September 1981 the USSR State Committee for Science and Technology and the All-Union Central Council of Trade Unions approved the conditions of this competition. The collectives, which have successfully fulfilled the assignments of the programs, the counterplans and socialist obligations and have achieved the best results in the development and introduction in the national economy of new kinds of products, types of machines and equipment, advanced technological processes and effective methods of the management of production, which conform to the present scientific and technical level, are recognized as the winners in the competition.

At present stable organizational forms of socialist competition in scientific collectives are being formed, effective methods of summarizing the results are being developed, the mechanism of the management and social development of scientific collectives is being formed, that is, "competition at scientific institutions and between them is finding its own nature."<sup>2</sup> Nevertheless in the organization of socialist competition in scientific collectives there are still very many unsolved problems, which require comprehensive study, scientific substantiation and the elaboration of specific recommendations which are aimed at its further improvement with allowance made for the specific nature of the labor of scientists, the changed conditions of the development of science and the role which is being assigned to it in the solution of the problem of combining the advantages of socialism with the achievements of the scientific and technical revolution. The theoretical elaboration of the problems of competition in scientific collectives for the present still lags significantly behind the needs of practice.

The goal of this work is the generalization of the experience of the organization and development of socialist competition, the analysis of the formulation and the intensity of the socialist obligations and the summarizing of the results of the activity of the competitors at the Institute of Economics of the Latvian SSR Academy of Sciences and on this basis the determination of the means of improving the organization of socialist competition in scientific collectives.

During the years of the 11th Five-Year Plan considerable work was performed at the Institute of Economics on the organization of socialist competition on the



basis of the consistent implementation of Lenin's principles: competitiveness, publicity, comparability and comradely mutual assistance.

The competition contributed to the increase of the volume of scientific output and the number of reports at conferences and to the extension of lecture propaganda (see the table).

Table

Indicators of the Stable Increase of Creative Effectiveness\*

| Indicators                                       | Unit of measurement | Years |       |       |       |       | percent ratio of 1984 to 1980 |
|--|---------------------|-------|-------|-------|-------|-------|-------------------------------|
|  |                     | 1980  | 1981  | 1982  | 1983  | 1984  |                               |
| 1. Monographs, collections, pamphlets            | Number              | 17    | 18    | 15    | 18    | 15    | 91                            |
|  | Publisher's sheets  | 67.9  | 71.8  | 63.5  | 99.3  | 47.1  | 69                            |
| 2. Articles                                      | Number              | 80    | 83    | 151   | 134   | 135   | 169                           |
|  | Publisher's sheets  | 39.5  | 36.8  | 58    | 62.6  | 60.3  | 153                           |
| 3. Summaries                                     | Number              | 57    | 47    | 47    | 74    | 92    | 161                           |
|  | Publisher's sheets  | 10.8  | 7.1   | 6.8   | 13.0  | 14.4  | 133                           |
| All scientific publications                      | Number              | 154   | 148   | 213   | 226   | 242   | 157                           |
|  | Publisher's sheets  | 118.2 | 115.7 | 128.3 | 174.9 | 121.8 | 103                           |
| 4. Reports at conferences                        | Number              | 44    | 182   | 110   | 111   | 119   | 270                           |
| 5. Lectures and speeches on radio and television | Number              | 265   | 353   | 363   | 379   | 381   | 144                           |

\*Calculated according to the data of the Institute of Economics of the Latvian SSR Academy of Sciences.

A set of organizational forms of socialist competition: individual competition among various categories of staff members (between senior scientific associates, junior scientific associates, economists) and competition among collectives of sectors (departments), has been formed and is in effect at the Institute of Economics. Such balanced and differentiated use with allowance made for the categories of competing staff members and collectives and the specific problems being solved by them made it possible to increase the mass nature of competition and to realize its possibilities more fully and to create at the institute more favorable conditions for the display of initiative and a creative attitude toward labor. Along with organizational questions great importance in the increase of the effectiveness of competition is being assigned to its orientation: the entire system of the organization of competition at the institute, which is distinguished by flexibility and the presence of feedback, which makes it possible to make the necessary adjustments subject to the changing external and internal conditions, is aimed

at increasing the creative output of each staff member. When developing this system it was possible to find the correct combination of the objective quantitative characteristics and expert appraisals of the competing subdivisions and staff members.

The tasks, which were posed in the decree of the CPSU Central Committee "On the Improvement of the Organization and the Practice of the Summarizing of the Results of Socialist Competition and the Stimulation of Its Winners,"<sup>3</sup> require the level of the organization of socialist competition both within and between scientific institutions to be increased significantly.

The new demands on socialist competition also presume the increase of the level of its management. The management of socialist competition is a creative, diverse and responsible matter and requires constant searching and improvement.

The organization of socialist competition holds an important place in the activity of the Institute of Economics of the Latvian SSR Academy of Sciences and is being carried out by the common efforts of the board of directors, the party buro, the trade union committee and the Komsomol buro.

The party organization carries out the overall monitoring of the conducting of the socialist competition, hears questions on the progress of the fulfillment of the assumed obligations, gives the necessary organizational assistance and takes part in the evaluation of the results of the competition.

The board of directors insures the coordination of the socialist obligations with the plans of scientific research work, submits to the mass production commission of the trade union committee information on the observance of planning and labor discipline and creates the conditions for the fulfillment of the obligations.

The trade union organization performs the necessary work when adopting the obligations, monitors and analyzes the progress of their fulfillment, summarizes and approves the results of the socialist competition and insures publicity and the stimulation of the winners. The elaboration and improvement of the Statute on Socialist Competition and the principles, which are the basis for the system of the summarization of the results; the coordination, analysis and monitoring of the progress of the socialist competition; the improvement of the mechanism of the gathering and processing of the information on the results of the competition, which makes it possible to obtain a comprehensive evaluation of the activity of each sector and staff member, have been assigned to the mass production commission of the trade union committee. The procedure of obtaining a comprehensive evaluation of the activity of the sectors and the results of the individual competition of staff members was carried out on computer.

The elaboration of the socialist obligations, which are assumed by the staff members and sectors of the institute at the beginning of the year, is the most important stage in the organization of the socialist competition at the institute. The existence of assumed socialist obligations is one of the conditions of participation in the competition.

The diversity of the assigned tasks and the potentials of staff members and collectives is complicating the elaboration of indicators for the assuming of obligations and the comparison of the achieved results.

The bearing of the socialist obligations on the plan is quite different, since the obligations are formed: in accordance with the plan of scientific research work (the early fulfillment of items of the plan), in development of the plan (additional research within the planned themes, the bringing of the results of research closer to use and introduction), outside the plan (additional new research themes). The obligations also differ according to the type of end result, which can be represented by a scientific report, publications, the publication of a monograph and the introduction and promotion of the results of one's own research.

The quantitative evaluation of the level of the development of socialist competition depends to a decisive degree on the completeness, specificity, intensity and soundness of the socialist obligations being assumed.

For the purpose of insuring the greater intensity of the socialist obligations being assumed additional points have been introduced--for fulfilled socialist obligations the number of points for the corresponding operations or measures is multiplied by the coefficient 1.2.

It is evident from the conducted analysis that the total number of additional points for the fulfilled socialist obligations for the institute as a whole increased in 1983 as against 1981 by 266 percent and comes to 5.6 percent of the sum total of points, or 1,692 points; during this period it increased per staff member of the institute by 241 percent and comes to 13 points.

The number of additional points for the fulfillment of the socialist obligations in the group of senior scientific associates in 1983 as against 1982 increased by 183 percent and comes to 13.5 percent of the sum total of points, or 680.8 points. During this period it increased per senior scientific associate by 322 percent and comes to 30.9 points. The proportion of additional points for the fulfillment of the socialist obligations in the sum total of points among senior scientific associates ranges from 0 to 20 percent.

In the group of junior scientific associates the number of additional points for the fulfillment of the socialist obligations in 1983 as against 1982 increased by 207 percent and comes to 17.9 percent of the sum total of points, or 416.4 points. During this period it increased per junior associate by 239 percent and comes to 13.4 points. The proportion of additional points for the fulfillment of the socialist obligations in the sum total of points among junior scientific associates ranges from 0 to 17 percent.

Among the sectors (departments) the number of additional points for the fulfillment of the socialist obligations in 1983 as against 1981 increased by 266 percent and comes to 5.6 percent of the sum total of points, or 1,691.8 points. The proportion of the additional points during this period in the sum total of points among the sectors (departments) ranges from 1.6 to 14 percent.

Thus, the increase of the intensity and proportion of the additional points for the fulfillment of the socialist obligations both for the institute as a whole and among senior and junior scientific associates is distinctive. The sharp fluctuations of the proportion of additional points for the fulfillment of the socialist obligations among the sectors and groups of scientific associates and within them show that in spite of some experience in the positive solution of the problems of the organization of the assuming of socialist obligations an inadequately high level of motivation and the formalism of the joining of individual staff members in the socialist competition and the incomplete realization of the creative potential of staff members and the functional possibilities, which are incorporated in the socialist competition, exist.

The lack of standards of scientific activity is having the result that the plans of staff members and collectives have an intensity which differs quite greatly. The different intensity of the assumed socialist obligations of staff members and collectives also follows from this: they serve as a means of bringing the amount of work up to the normal level and a means of significantly increasing the efficiency of work by means of the intensification of activity and the revealing of internal reserves.

To insure the goal orientation of the assumed obligations at the institute it is necessary to draw up in advance their minimum mandatory list, which corresponds to the components of scientific research, organizational and community activity, since the quantitative evaluation of the level of development of socialist competition depends to a decisive degree on the completeness, specificity, intensity and soundness of the social obligations being assumed.

The specific features of academic science (the probabilistic nature of the achievement and practical implementation during the period in question of the results of fundamental and basic scientific research, the difficulty of the economic evaluation of the effectiveness of the results of research) required a set of evaluation indicators to be used for the evaluation of the efficiency of its activity. Expert point evaluation is used at the institute, moreover, scientific research activity has the largest proportion in the points, it is decisive in case of the expert evaluation, moreover, the sum of the positions by sections of "The Statute on Socialist Competition" is also taken into account so that individual successes would not be decisive when summarizing the results.

The use of quantitative indicators in the evaluation of the activity of scientific associates and collectives when summarizing the results of the socialist competition showed that the evaluation information not only insures the solution of the problem of comparability and the identification of the winners in the socialist competition, but is also the information basis for the solution of a large number of organizational and management problems which contribute to the further increase of the efficiency and quality of scientific research.

The evaluation of the activity and the summarizing of the results of competition at the Institute of Economics was consistently developed and

improved on the basis of extensive discussion by the community of the institute, experimental testing, the organization of accounting and the consideration of proposals.

Competent staff members of the institute, who know the work and specific nature of each sector of the institute, jointly with representatives of the board of directors and public organizations carried out the compilation of the list of indicators and the weighing of the evaluation of each job for the objective comparison of directly incomparable items. However, no matter how perfect the techniques and methods of the quantitative evaluations of the comparison of the achievements of the competitors are, they still cannot become exhaustive criteria, by means of which it would be possible to take into account all the differences and features, which distinguish collectives from each other. Therefore, the procedure of summarizing the results of socialist competition at the institute along with the quantitative evaluation includes an expert evaluation of the results of the activity of the competitors by a competent collective organ--the expert commission which is headed by the director of the institute. The additional expert evaluation makes it possible to take into account more correctly and collectively the actual output of the department or individual staff member. Here it is possible to decrease the role of formal indicators, which do not always fully reflect the real essence of creative work. The use of a mixed system for the evaluation of the results of labor competition became a necessity: it is conducive to greater objectivity of the decisions being made and maintains a healthy moral and psychological climate in the collective.

The evaluation of the results of activity at the institute is carried out in accordance with four groups of indicators:

- 1) the evaluation of the results of scientific research work and the training of personnel is made in accordance with monographs, collections, books, pamphlets, articles, reviews, responses and heads of reports, which have been published and are in print, in accordance with published scientific papers, proceedings and reports to management organizations and directive organs, in accordance with scientific proceedings, detail contractor and conceptual designs, computer programs, which have been newly written and drawn up with instructions, the delivery of reports at scientific conferences, the results of work on the improvement of skills, as well as in accordance with other results of scientific activity and includes 10 indicators;

- 2) the evaluation of the results of the introduction and use of scientific developments in the national economy includes four indicators and is carried out in accordance with the results of the introduction of completed scientific research, as well as in accordance with the results of the fulfillment of the plan of economic contractual work and the contracts on creative cooperation;

- 3) the evaluation of scientific organizational activity is made subject to the activeness in the preparation and conducting of scientific conferences and seminars, the promotion of economic knowledge and the results of one's own achievements, the exhibiting of works at exhibitions and the acting as an opponent, in the preparation of opinions and conclusions on dissertations, the

reviewing of monographs, dissertations, collections, articles and other materials, as well as the editing of monographs, collections, theses, analytical surveys, abstracts--nine indicators in all;

4) the evaluation of community work is made in accordance with six indicators subject to the activeness of the contribution of staff members to the successful performance of scientific research work and the increase of the ideological and political level.

In accordance with the existing statute at the institute the evaluation is made according to the following developed and tested formula:

$$O = \frac{\sum_{i=1}^n \sum_{j=1}^m (B_{ij} + B'_{ij}) k_{ij}}{H_{cp} \frac{\Phi 3 \Pi_o}{\Phi 3 \Pi_{n, cp}}},$$

where  $O$  is the numerical evaluation (in points);

$n$  is the actual number of staff members of the department (sector);

$m$  is the number of measures and operations, which are taken into account in the socialist competition;

$H_{cp}$  is the average number of staff members of the institute during the past 3 years;

$\Phi 3 \Pi_o$  is the actual wage fund of the department (sector);

$\Phi 3 \Pi_{n, cp}$  is the average wage fund of the institute during the past 3 years;

$k_{ij}$  is a coefficient which takes into account the fulfillment of the assumed socialist obligations;

$B_{ij}$  is the number of points obtained by each staff member  $i$  for each measure or job  $j$  in accordance with the statute;

$B'_{ij}$  is the additional points to staff member  $j$  for measure or job  $j$ , which take into account the quality of the work, the topicality, the scientific novelty and so forth.

The improvement of the evaluation of labor in science is one of the important problems in the organization of competition.

A specific sequence in the submitting of materials on the results of the competition has been established at the institute. The summarization of the results of the socialist competition is carried out quarterly with a cumulative total. It is possible to regard the quarterly period of the summarization of the results as optimal, since the opportunity is created for each staff member, sector or department to estimate prior to the final results its place among the competitors. The lengthening of the period of the summarization of the results to half a year and a year will stimulate to a smaller degree an intensive form of work.

The summarization of the results of the socialist competition is carried out in two stages. At the first stage the mass production commission of the trade union committee jointly with the expert commission (the director of the institute approves the composition of the expert commission) prepares proposals in accordance with the results of the socialist competition for the quarter and for the year and submits them for discussion to the expanded meeting of the trade union committee.

The final results of the socialist competition are approved at the expanded meeting of the trade union committee jointly with representatives of the administration and the party and Komsomol buros.

Many years of experience have shown that such a system makes it possible to take thoroughly into account the theoretical and experimental level of research, is conducive to the objectivity of the evaluation of competitors when summarizing the results and contributes to the increase of the amount of scientific output, the fulfillment of the plan of scientific research work and the development of the initiative and creative activeness of staff members.

The results of socialist competition are becoming more and more an object of attention of the board of directors and public organizations. The practice, which has been adopted at the institute, of reports of staff members on participation in the socialist competition at meetings of the party buro in the presence of representatives of the board of directors, the trade union committee and the Komsomol buro and the discussion of the results of socialist competition at party and trade union meetings are contributing to the increase of the effectiveness of the competition.

The analysis of the results of socialist competition at the institute is made by groups of senior scientific associates, junior scientific associates and scientific subdivisions (sectors and departments).

The conducted detailed analysis of the results of the individual competition for the past 3 years (1982-1984) made it possible to establish the following: on the average 22 people took part in the competition in the group of senior scientific associates. The number of points on the average per staff member ranges from 991.5 to 55.3. The average rating per staff member on the average came to 381 points, 41.3 percent of all the senior scientific associates achieved greater than the average.

The average total of points of the staff members, who took the first 4 places, exceeds by 18-fold the average total of points of the staff members,

who took the last 4 places, and exceeds by 2.1-fold the average indicator among senior scientific associates, while the average total of points of the staff members, who took the last 4 places, is two-seventeenths as great as the average indicator among senior scientific associates.

The following data reflect the structure of the amount of work, which was done by the winners of the socialist competition among the senior scientific associates on the average for the 3 years:

First place--scientific research work makes up 87 percent, scientific organizational work makes up 9 percent and community work makes up 4 percent;

Second place--respectively 82 percent, 10 percent and 8 percent;

Third place--76 percent, 16 percent and 8 percent; among those who took the last places it comes, respectively, to 60 percent, 4 percent and 40 percent.

The amount of work, which was done on the average in 3 years by the senior scientific associates who take the first places, exceeds the amount of work of those who take the last places with respect to scientific research work by 18.3-fold, with respect to scientific organizational work by 12-fold and with respect to community work by 2-fold.

Consequently, the senior scientific associates, who in the socialist competition take the first places, surpass the lagging associates in all the directions of work. However, it must be noted that the scientific associates, who have published the results of work over several years, frequently become the winners. Hence one of the main problems of summarizing the results of the socialist competition--how to evaluate properly works which have a lengthy cycle.

The number of points, which were accumulated on the average in 3 years by one senior scientific associate, exceeds by 1.4-fold the number of points which were accumulated on the average by one junior associate.

When evaluating this ratio it is necessary to take into account the objective differences in the structure of the total of points among senior and junior scientific associates.

For the group of junior scientific associates on the average in 3 years 31 associates took part in the competition, the number of points per associate on the average ranges from 620 to 21.5, the average rating per associate on the average comes to 236.3 points, 39.1 percent of the junior scientific associates achieved greater than the average rating.

The average total of points of the junior scientific associates, who took the first 4 places, on the average in 3 years exceeds by 5-fold the total of points of those who took the last 4 places and by 1.8-fold the total of the average indicator, while the average total of points of the associates, who took the last 4 places, is ten-twenty sevenths as great as the average indicator. The following data reflect the structure of the amount of work, which was done by the winners of the socialist competition:



First place--scientific research work makes up 71 percent, scientific organizational work makes up 15 percent and community work makes up 14 percent;

Second place--respectively 83 percent, 5 percent and 12 percent;

Third place--78 percent, 5 percent and 17 percent; among those who took the last places it comes to 32 percent, 49 percent and 19 percent.

The amount of work, which was done by the junior scientific associates who take the first places, exceeds the amount of work of those who take the last places with respect to scientific research work by 11-fold, with respect to scientific organizational work by 1.2-fold and with respect to community work by 5-fold.

Consequently, the junior scientific associates, who in the socialist competition take the first places, also surpass the lagging associates in all the directions of work.

However, such significant fluctuations of the average indicators attest to reserves of the increase of the intensity of the work of a specific portion of the associates of the institute. At the same time, as the dynamics shows, during 1981-1984 the difference of these indicators decreases significantly.

The sectors (departments), which accumulated the largest number of points per conditional staff member, are the winners in the collective socialist competition. Such an approach enabled even small collectives to take "prize-winning places." The analysis shows that 10 sectors with 7.8 to 22 conditional staff members are taking part in the socialist competition at the institute. during 1982-1984 the sectors (departments) with less than the average number--12.5 conditional staff members--took the first 3 places 5 times. On the average in 3 years 130 staff members of the institute took part in the competition among sectors (departments), the average rating per conditional staff member came to 234 points, the number of points by sectors ranges from 339 to 152.1. The average total of points of the sectors, which took the first places, exceeds by 2.7-fold the average total of points of the sectors which took the last places.

The analysis of the structure of the performed work shows the fluctuation of the indicators with respect to scientific research work from 85 percent to 59 percent, scientific organizational work from 25 percent to 4 percent and community work from 85 percent to 7 percent.

On the average the amount of work, which was done by the departments which took the first places, exceeds the amount of work of those which took the last places with respect to scientific research work by 2.5-fold, with respect to scientific organizational work by 1.2-fold and with respect to community work by 1.4-fold.

The analysis showed that such a significant difference in the results of the activity of staff members and collectives depends to a great extent on the establishment of sound plan assignments and the intensity of the assumed

socialist obligations. Therefore, the organization of the competition in the scientific collectives with allowance made for the potential of each competing staff member and sector in accordance with a scientifically sound plan-obligation is necessary

The system of the organization of competition, which has been used at the institute for many years, has confirmed the correctness of the adopted direction and the effectiveness of its forms, which, undoubtedly, does not rule out the elaboration of measures on its further improvement.

Thus, in summarizing the results of the competition so far it has not yet been possible to achieve the consideration of what is called the "intermediate product," while this at times places some collectives and individual staff members under difficult conditions.

Elements of formalism still exist in the organization of the socialist competition at the institute, the efforts of individual staff members are aimed at the solution of minor problems and at the achievement of intermediate results. A portion of the staff members are not working to full effect and are content with average results; when summarizing the results the quality of scientific research work is not being taken fully enough into account.

It is impossible to regard the work on the development of competition in the collective of the Institute of Economics as completed, it needs further development and improvement with allowance made for the present requirements.

In our opinion, first of all the following factors guarantee the success of socialist competition under the specific conditions of the scientific institution of the humanities type: the establishment of sound plan assignments and the intensity of the socialist obligations being assumed, the simplicity and clarity of the summarization of the results, which make it possible to take into account the remarks and suggestions of staff members; the use of a comprehensive indicator of work efficiency, which takes into account both the quantity and the quality of various types of scientific activity, the ranking in accordance with the results of the socialist competition of the staff members by groups of competitors and among the collectives of sectors and departments.

#### FOOTNOTES

1. PRAVDA, 31 August 1971.
2. Ye. I. Kapustin, "Competition in Science," SOTSIALISTICHESKOYE SOREVNIVANIYE, No 3, 1983, p 31.
3. PRAVDA, 30 September 1983.

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## AUTOMATION AND INFORMATION POLICY

### EDITOR IN CHIEF ON NEW BULLETIN OF SOCIETY FOR KNOWLEDGE

Moscow POLITICHESKOYE SAMOOBRAZOVANIYE in Russian No 9, Sep 85 pp 143-144

[Article by Candidate of Technical Sciences A. Malinov, editor in chief of the editorial board of the bulletin NTR: PROBLEMY I RESHENIYA: "The New Bulletin of the Society for Knowledge"]

[Text] The bulletin of the All-Union Society for Knowledge NTR: PROBLEMY I RESHENIYA, which began to be published at the end of May of this year, is a new periodical of the type, which is customary to the reader at large (its issues have the format of the newspaper NEDEL'YA), and a not entirely conventional periodical among scientific and technical periodicals. In contrast to specialized scientific and sectorial publications the bulletin is called upon to cover the achievements of various fields of science and engineering practice and is intended for a broad group of readers: scientists and engineers, production organizers of all levels.

For the propagandist it can be a valuable source of information because it affords the opportunity to see how interdisciplinary scientific and intersectorial production problems, and first of all the key tasks on the updating of equipment and technology, arise and how they are resolved.

The rapid changes in the labor and life of people, which are accompanying the present scientific and technical revolution, require of all the participants in scientific and technical progress not only the constant updating of knowledge, but also the mastering of the methods, means and art of their practical use. This is especially important in our times, when the party has advanced the acceleration of scientific and technical progress as a vital issue of economic policy.

The fate of any scientific and technical idea depends completely on how thoroughly not only the scientist or inventor, but also the designer, the production organizer and the process engineer--in short, all those, who are to develop new equipment, and those, for whom it should become a help in work and in life--are imbued with it.

The editorial board of the bulletin sees its task in covering as thoroughly and vividly as possible the questions of scientific and technical progress and in popularizing and "translating" new scientific and technical ideas into the

languages of all categories of specialists, since the very fate of any innovative idea in many ways depends on this.

We are striving to cover scientific and technical problems in all genres--information ("The Pulse of the Scientific and Technical Revolution"), journalism, reporting, interviews and round tables. We are allotting space for showing the achievements of not only domestic, but also foreign scientific and technical thought.

The arsenal of effective scientific and technical decisions, which has already been accumulated in the country, is especially valuable. The information on them constitutes the basis of the published materials and sections "The Address Key," in which the coordinates of the sources of information on some specific scientific, technical and engineering problems or others are specified.

It is not for us, the editorial board of NTR: PROBLEMY I RESHENIYA, to judge how fruitfully the work is being conducted in this direction. I will merely say a few words about what has been done.

Contact has been established with the reading audience, its "core contingent" and, by means of it, the group of topical themes, as well as the forms and methods of their elaboration and coverage, which are most convenient for the reader, have been determined. We began with experimental trial issues. On their basis conferences of readers and surveys were conducted in the largest scientific and industrial centers of the country and the responses of readers were analyzed. Thus the desires of several thousand readers were the basis and suggested the appearance and structure of the bulletin.

Now a few words on the publications, which are most interesting, in our opinion, for propagandists, in the published issues of the bulletin.

"The Key to Intensification Is Advanced Technologies"--such is the title of our first thematic spread "The Problem Up Close." This is a description of the latest technologies and a new data bank.

Academician B. Ye. Paton told in detail about how the engineering centers, which are speeding up substantially the advance of scientific and technical innovations into practice, are operating at the Ukrainian SSR Academy of Sciences.

"Operation 'Replacement'"--the article of M. Yesenkov, deputy chief of the Department of the Chemical Industry of the USSR State Planning Committee, was published under such a title. The author demonstrated the possibilities of synthetic analogues, which are capable of freeing natural products--vegetable oil, cotton and so on--and of returning them to the people.

Corresponding Member of the USSR Academy of Sciences L. Ovchinnikov and Candidate of Geological Mineralogical Sciences A. Kremenitskiy in the article "Profiles of the Ultradeep" showed what the deepest wells are giving science and practice.

"Progress and the Plan"--the reflections of Academician V. Koptug, vice president of the USSR Academy of Sciences and chairman of the Siberian Department of the USSR Academy of Sciences, on the optimum control of the pace of scientific and technical progress were thus named. The material covered an entire issue which was devoted to large-scale science of Siberia.

One of the most topical problems is "Computers. How Are We to Assimilate Them?" Academician A. Samarskiy, a prominent Soviet mathematician and physicists, examined it in detail on the pages of the bulletin.

The directors of enterprises, who are graduates of the Institute for the Improvement of the Skills of Managers of the Highest Level of State Management of the Academy of the National Economy attached to the USSR Council of Ministers, gathered at a round table of the editorial board in order to discuss specific questions of the acceleration of scientific and technical progress. The statements of the participants in the discussion which developed were published in the center spread of the bulletin under the title "Machine Building: The Concerns and Reckonings of the Director."

Of course, this is only a small part of the publications of the first issues of NTR: PROBLEMY I RESHENIYA.

An editorial council under the supervision of Chairman of the USSR State Committee for Inventions and Discoveries I. S. Nayashkov is in charge of our publication. Prominent representatives of Soviet science: Academicians N. G. Basov, D. K. Belyayev, S. V. Vonsovskiy, N. S. Yenikolopov, G. A. Nikolayev, A. Yu. Ishlinskiy, B. Ye. Paton, K. V. Frolov and others, are members of the council. Representatives of the USSR State Committee for Science and Technology and the USSR State Planning Committee also belong to the council.

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## AUTOMATION AND INFORMATION POLICY

## DEVELOPMENT OF ROBOTICS, INTENSIFICATION OF PRODUCTION

Kishinev KOMMUNIST MOLDAVII in Russian No 8, Aug 85 pp 34-41

[Article by Academician of the Moldavian SSR Academy of Sciences A. Ursul:  
"The Intensification and Robotization of Production"]

[Text] The acceleration of socioeconomic development and the improvement of the society of mature socialism, as was emphasized at the April (1985) CPSU Central Committee Plenum, will be governed to a decisive extent by qualitative changes in the economy, its changeover to the path of intensive growth and the utmost increase of efficiency. And the cardinal acceleration of scientific and technical progress is the main strategic lever of the intensification of the national economy and the better use of the accumulated potential. This is a vital issue of party economic policy. Particular importance is being attached here to the broadening of research, which has a technical orientation and provides an outlet to machine building. The role of the basic sciences and those academic institutes, which are developing the theoretical principles of fundamentally new types of equipment and technology, which revolutionize production and make it possible to achieve a new level of efficiency, is increasing substantially.

Among these promising developments, which are contributing to the resolute turn of science toward production and of production toward science and which were spoken about at the All-Union Conference in the CPSU Central Committee on Questions of the Acceleration of Scientific and Technical Progress, an important role belongs to the development of microelectronics, to computer technology and instrument making, to the entire information science industry, as well as to the organization of the mass production of equipment of new generations, which is capable of providing an increase of labor productivity by many fold and of opening the way to the automation of all the stages of the production process.

The development of robotics and the robotization of production, the prospects of the development which are oriented no longer simply toward the classification of individual functions of man in the process of production, but at his complete replacement in this process and the formation of "unmanned" technology, hold a special place among the technical factors of intensification.

Robots themselves and robotized production are among the productive forces of society, among their material components which realize the influence of man on nature. In robots and robotized production, perhaps, "the replacement of manpower by the forces of nature" occurs to the greatest extent, which expresses in concentrated form the basic social law of the development of the equipment which is created by people (see K. Marx and F. Engels, "Soch." [Works], Vol 23, p 397).

The changeover of production to the path of intensification in the area of both industry and agriculture also consists precisely in the replacement of man by the forces of nature of greater and greater power, force and quality. The occurring cases of reverse motion, that is, the replacement of the forces of nature by human labor, about the impossibility and inefficiency of which V. I. Lenin wrote (see "Poln. sobr. soch." [Complete Works], Vol 5, p 103), do not express the main direction of technical progress. They are characteristic only of those socioeconomic formations, which are oriented toward the exploitation of man by man and transform man into an appendage of a machine and equipment, which appears especially clearly under the conditions of capitalism. Therefore, the goal of socialist intensification should be that human labor would be replaced to a greater and greater extent by the forces and processes of nature, while man himself would be removed from the immediate production process.

One of the cardinal means for this is complete automation, which is called upon to remove man from the immediate process of production, and he, as K. Marx noted, instead of being the main agent of production, stands beside it (see K. Marx and F. Engels, "Soch.," Vol 46, Part II, p 213). This process coincides in its basic content with the process of intensification, since only the replacement of human labor by the forces of a physical, chemical and biological nature of a higher and higher quality can and should lead to comprehensive intensification, which has a truly humanistic essence. For "the social need for intensification under socialism is unlimited, since the basic economic law of this formation presumes the greater and greater subordination of the forces of nature to man."<sup>1</sup>

The essence of this intensification process is traced most clearly in the example of the robotization of production. As is emphasized in the literature on robotics, "robotics owes its appearance and rapid development over the past 10-15 years first of all to the vital needs of social production at the present stage of its development, which consists in the need for complete automation and the removal of man from direct involvement in the production process. The traditional means of mechanization and automation, which are being used today, have turned out to be inadequate for the cardinal solution of this problem. A fundamentally new means, which would be distinguished by such a universality of actions and quickness of the changeover to the performance of new operations, which only man has today, was required. The robot is such an automatic machine of the new type, which has fundamental universality (multifunctionality) with respect to mechanized actions and algorithms of interaction with the environment up to the display of artificial intelligence."<sup>2</sup>

Consequently, the emergence and progress of robotics are due to the effect of socioeconomic laws and the vital needs of social production at the present stage of socioeconomic development. The immediate involvement of man in the technological process is a serious obstacle in case of the intensification of production,<sup>3</sup> since the physiological possibilities and limitations of man are now already becoming the limiter which is complicating the further increase of the pace and the broadening of the scale of the development of productive forces. And although the main productive force is man, his use in this capacity is far from always efficient: he is forced to engage in difficult physical and routine monotonous labor and to work under conditions which are harmful to the health and even dangerous to life. It is clear that the main means of the rationalization of production consists in freeing man from these and similar labor functions, while, consequently, the robotization of production acts as the means of this rationalization and, thereby, intensification.

Robots are a qualitatively new means of human activity and its intensification. "This new class of technical systems," it is noted in the literature, "differs fundamentally from conventional traditional means of mechanization and automation by the fact that it has a multiple purpose and is easily changed over to the fulfillment of the most diverse labor operations and intellectual actions, including under changing and unpredictable conditions. Robotics is not the improvement of some type of old equipment. This is a fundamentally new stage of the mechanization and automation of various physical and mental operations. Robotics affords man new possibilities, which are not comparable with anything, for fulfilling such operations which it is impossible to carry out by any other now existing technical means."<sup>4</sup>

We are specially singling out and emphasizing the fact robotics is distinguished from traditional equipment in general and means of automation in particular by universality, multifunctionality, the quickness of the changeover to new operations and so on. For, on the one hand, this enables robotized production to have all the basic advantages, which it had during the immediate participation of man in it, and, on the other hand, also makes it possible to carry out what it is not only difficult, but also simply impossible for man to do, that is, under extreme conditions, which are beyond the possibility of the vital activity of man (deep under water, in open space, in gas-filled mines, at atomic installations and so on).<sup>5</sup>

Thus, robotics is turning out to be a qualitatively new and very promising factor of the intensification of production, by means of which it is possible to achieve a cardinal qualitative change in the development of productive forces and to combine effectively the achievements of the scientific and technical revolution, of its latest stage, with the advantages of mature socialism. Here, while noting that owing to the robotization of production as an important factor and to the direction of intensification the efficiency of social production is increasing, we would like to single out two aspects of this problem--the economic and the social.

In the literature on the use of robots their role in the growth of labor productivity and the increase of the economic efficiency of production is



particularly emphasized. For example, under the conditions of smoothly operating production robots replace man, while exceeding the established norms by two- to threefold, moreover, according to the calculations of foreign specialists, the use of industrial robots makes it possible to increase the degree of utilization of general-purpose equipment by 35 percent, they pay for themselves within 2-5 years of operation in case of continuous use during 2-3 shifts.<sup>6</sup> Labor productivity--as the main criterion of production efficiency in case of the ganged use of robots--increases even more, in a number of instances increasing by 10-fold as compared with similar activity of people. Owing to the use of robots as a qualitatively new means of the complete automation of production (and this is one of the most important directions in the set of factors of its comprehensive intensification) equipment and manpower resources are used more efficiently, the smoothness and intensity of labor increase, the shift coefficient increases, defective output decreases and product quality is improved, the expenditures on labor safety practices and the ecologization of technology decrease and so on.

The increase of the economic efficiency in case of the intensification of production by means of robotics is also augmented by the social efficiency, which for the present or in principle it is impossible to measure. This is first of all the freeing of people from difficult exhausting labor, unappealing and unpleasant jobs and labor under conditions, which are harmful and dangerous to health and life, the alleviation of the problem of the shortage of manpower and the elimination of unfavorable demographic prospects, the decrease of traumatic injuries and occupational diseases and the shortening of the length of the work week, not to mention the fundamental possibility of using robots where the presence of man is difficult. The robotization of these types of activities under the conditions of socialism will make it possible to change the content of human labor, to make it more creative and to create favorable conditions for the harmonious and all-round development of the individual. The robotization of production is making a significant contribution to the accomplishment of this humanistic goal. It will lead to the optimum combination of mental and physical labor, to the achievement of greater social homogeneity and to the substantial increase of the creative principle in the labor activity of people.

That is why, taking into account the role of robotics in the increase of socioeconomic efficiency and the humanization of production, it is possible to support the opinion of Ye. P. Popov, a well-known specialist in the area of robotics, who stressed that "in case of evaluations of the advisability of using robotic means in the national economy it is necessary to take into account not only their economic efficiency, but also their enormous social role. In a number of instances, for example, when it is a question of withdrawing people from harmful and dangerous conditions and of freeing them from especially difficult physical labor, the importance of the social impact should prevail. It is necessary to implement such forms of robotization first of all, but, of course, by the most economical means of all the possible ones in the given application."<sup>7</sup> It seems that robotization under the conditions of socialism and its social efficiency should not only augment the economic efficiency, but also prevail over it and are called upon to help in solving the problem of not only product quality, but also the quality of life and in improving the conditions for the display by man of his creative abilities.

The economic and social efficiency of robotics is directly connected with the fact that the robotization of production is one of the most important levers, "mechanisms" of the changeover to the comprehensive intensification of the national economy. The further robotization of production with the extensive use of robots of the first, and then the second and third generations, will make it possible to accomplish the new revolutionary reorganization of all social production and many nonproduction spheres and to increase substantially the socioeconomic efficiency of all social activity.

While examining the prospects of the robotization of production, let us direct attention to the fact that two processes, which are interconnected and follow each other, are realized here.<sup>8</sup> First, the application of robots to operating types of production, when robots (primarily of the first generation) are adapted to existing technological processes, equipment, organization and management, initially takes place. Second--and this is the basic, but more difficult task--fundamentally new production with qualitatively more advanced equipment, technological techniques, organization and so on, which is already based entirely on the extensive use of robots of all three generations, is set up. Precisely this is also robotized production in the full sense, if we bear in mind that it is a question of complete automation as an aspect of comprehensive intensification and a question of the latest revolution in social production.

Dual adaptation: the adaptation of robots to the production process, which is oriented toward man, and the adaptation of production, from which man has already been removed as an immediate participant in it, to advanced robots, will occur during the realization of these two processes of the robotization of production. The degree of development of these two interconnected adaptation processes of robotization depends on the specific situation and the socioeconomic requirements. However, in the future, when more advanced, adaptive robots are developed, production for the most part will be oriented not toward people, but toward robots, which are becoming an important component of it. Man in this case, while ceasing to be the main agent of production and replacing his labor with the operation of robots, does not withdraw completely from this process, which satisfies his needs. Now man, according to the statements of K. Marx, treats "the very process of production as its controller and regulator," performing more creative, intellectual functions (see K. Marx and F. Engels, "Soch.," Vol 46, Part II, p 213).

The adaptation of robots to functioning types of technologies and industrial complexes to some extent is already being accomplished by first-generation robots which use programmed control. Their use requires the complete stability of all the working conditions, including the intrinsic characteristics. Adaptive robots (of the second generation) react to the changes of the environment by changing the control algorithm, owing to which the ranges of their operation are broadened and work quality improves. This applies all the more to the third generation of robots ("intelligent"), which in their potentials approximate man.

The improvement of robots is proceeding primarily in the direction of the increase of the degree of their adaptive potential and information

possibilities by the increase of the elements of "artificial" or, more precisely, "computer" intelligence. Two means of developing adaptive robots stand out here. They are distinguished in the literature on robotics, for example, when it is emphasized that in case of the development of "robots as a whole the copying of man and living nature in general is one of the natural means. However, the search for new means within modern technology is a no less important and, in the future, the basic means."<sup>9</sup>

The question arises: What is the reason for the production of robots which copy the behavior of man? For it is well known that the attribute of "copying" was even made the basis of the popular definition of the concept "robot." Thus, in "Bolshaya sovetskaya entsiklopediya" [The Great Soviet Encyclopedia] "robot" is defined as a machine with anthropomorphic (manlike) behavior, which partially or completely performs the functions of man (at times an animal) when interacting with the surrounding world.<sup>10</sup>

In our opinion, the anthropomorphic nature of the behavior of robots is associated not simply with the purely external copying of man and his functioning, but with deeper causes, with the development of social production and with the fact that man is the main productive force. For modern production, which has been developed by man, has been adapted to him, and for this reason the replacement of people by robots in the production process also requires the development of "manlike" robots. At one time American scientist and writer I. Asimov directed attention to this, when he wrote: "If a machine should do everything a man does, then it is expedient that in form it also be similar to man. This is desirable not only because man himself has been adapted to activity in his environment, but also because, being able to use equipment, he creates an environment which has been adapted to himself.... The manlike robot will be adapted to the world, which was created by man and which created man, and thereby it will approximate a modern machine. It is desirable that robots would have an appearance similar to man also because this will be more pleasant to us. A manlike machine is closer and more comprehensible to man. A machine with the appearance of a man arouses a greater liking than a machine which has any other appearance."<sup>11</sup>

At the same time, it is important to note that the development of "nonanthropomorphic" robots is completely practicable at the second stage of the robotization of production, when it will be adapted to advanced robots. In this case by this concept we will understand not the robot, which I. Asimov describes and which completely copies and in appearance is reminiscent of man and thoroughly imitates his behavior, sense organs and intelligence, but the robot which will be able to meet all the needs of man for it and first of all the needs for the development of thoroughly robotized production. This provides occasion for and the possibility of a broader definition of the concept "robot," while simultaneously taking into account both means of the development of robotics. By an advanced robot in this broad sense we will understand an artificial device, which is equipped with "artificial intelligence" and sensory organs, insures to the greatest extent adaptive behavior and is capable of fully functioning in the immediate production process and other spheres of social activity, completely replacing man.

Thus, not the attribute of the copying of the behavior and appearance of man, but his complete functional replacement in production and other types of social activity is made the basis of this definition. Specifically how this replacement will take place--on an anthropomorphic or another basis--will be determined not by considerations of the copying of man and animals, but by the requirements of socioeconomic efficiency and first of all by the fact that robots should become the universal assistants of man, in the end realizing in their own regard the humanistic thesis: "Everything in the name of man, everything for the good of man." Such robots will fully serve the all-round and thorough development of man, but will not overwhelm him and revolt against him, as is frequently described in the science fiction of bourgeois authors.

The need for the consideration and greater and greater use of adaptive factors on the basis of cybernetic devices ("computer intelligence") is traced in the process of the robotization of production. The development of robotics as a technology, which substantially increases its adaptive potential, points out to us precisely the dialectical combination of adapting and adaptive functions. In this connection the problem of the increase (and the determination) of the adaptive potential of not only agricultural production,<sup>12</sup> but also industrial production arises. Robotization, by accomplishing the functional replacement of man in the immediate production process, with the increase of product quality, in the near future will be able to increase substantially the adaptive potential of equipment and, apparently, not only in the sense that robots will be adapted to production, but also in the sense that "intelligent" robots, that is, advanced third-generation robots, will be able to interact with nature more harmoniously than man now does under the conditions of modern technology. That is why the robotization of production from the very start of its emergence should be combined fundamentally with the ecologization of production or, on a more general level, with such a reorganization of it on a new qualitative basis that the economic requirements and the requirements of robotics would act as components of the system of the comprehensive intensification of all social production.

The increase of the adaptive possibilities in the process of the robotization of production and the greater and greater use of biological factors (the development of bioproduction) attests to the trend toward the changeover during intensification to adaptive technology and equipment, which at the same time proves to be ecologically efficient as compared with traditional technology and equipment. Thereby the adaptive means of production at the same time also proves to be ecological equipment and technology, which unite into a single system the socioeconomic and ecological requirements as components of an efficient strategy of the intensification of social activity.

As a result the consideration of the adaptive characteristics of not only agricultural, but also industrial production acts as a requirement of the further transition to the most efficient intensification. Grounds appear to pose the question of the need for the increase of the adaptive potential of social production as a whole and of the optimum combination of the adaptive and adapting characteristics of the entire system of the interaction of society and nature as a unified system of socionatural development, which is oriented toward the maximum aggregate, that is, synergetic, impact.

The universality of the tendency for the adaptive factors of intensification to increase is also confirmed by the possibilities of the robotization of not only industrial, but also agricultural production, of course, with allowance made for its peculiarities, in the course of robotization.<sup>13</sup> However, in spite of the more difficult nature of the introduction of robots in the agricultural sphere, prospects of both the increase of the productivity of agricultural labor by three to fivefold and the increase of the social efficiency and standards of production come to light here.<sup>14</sup>

The robotization of agricultural production is of particular importance for our republic, where the agroindustrial complex is playing a dominant role in the national economy. The fact that both agriculture itself and the sectors of industry, which are connected with it, are mainly of a seasonal nature and are distinguished by a diversity of technological processes, gives grounds for the introduction of robotic complexes and their transformation with time into flexible automated manufacturing systems. At the same time the robotization of industrial production acts as an important direction of its intensification in the region and creates additional possibilities for the further increase of the share of industry in the national economy of Moldavia and for the overall increase of its stability and efficiency.

That is why the task of elaborating measures of the basic acceleration of scientific and technical progress, having envisaged, starting with the 12th Five-Year Plan, the extensive use in the national economy of flexible automated systems, robotic complexes, microprocessor equipment and means of computer-aided design and the control of the production process, was set at the held 19th Moldavian CP Central Committee Plenum for the Moldavian SSR Academy of Sciences jointly with ministries and departments of the republic. The elaboration of these questions will be carried out within the framework of the republic program "Automated Systems," in which the Moldavian SSR Academy of Sciences is acting as the main organization and in which such academic subdivisions as the Institute of Applied Physics and its pilot plant, the Special Design and Technological Bureau of Solid-State Electronics, the Institute of Mathematics with the Computer Center and the Department of Power Engineering Cybernetics will be put to work. The introduction of highly efficient automated systems on the basis of microprocessor devices and robotic complexes is an important direction of the acceleration of the development of science and technology and, on this basis, of the comprehensive intensification of production and other spheres of activity of man.

The development of robotics and the introduction of its achievements in practice will make it possible to accomplish the task, which was posed at the April (1985) CPSU Central Committee Plenum and the All-Union Conference on the Acceleration of Scientific and Technical Progress, of changing over to fundamentally new technological systems and to equipment of new generations, which provide the greatest efficiency.

The use of robots is not limited only to the sphere of social production. They are already being used and will be used more and more extensively in the sphere of services, education, management, the development of space and the automation of scientific and many other areas of social activity. The intensification of production is leading to the changeover to the intensive

means of the development of other types of activity of people and robotization is gradually turning into a pervasive and long-term trend, which is conducive to the acceleration of scientific, technical and socioeconomic progress.

#### FOOTNOTES

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2. "Upravleniye robotami ot EVM" [The Control of Robots From a Computer], Leningrad, 1980, p 3.
3. See L. I. Abalkin, V. D. Kamayev and Ye. I. Yurevich, "Avtomaticheskiye manipulyatory (promyshlennyye roboty) v narodnom khozyaystve: sotsialno-ekonomicheskiye aspekty" [Automatic Manipulators (Industrial Robots) in the National Economy: The Socioeconomic Aspects], Moscow, 1980, p 32.
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9. "Ustroystvo promyshlennykh ob'yektov" [The Equipment of Industrial Facilities], Leningrad, 1980, p 10.
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12. See A. A. Zhuchenko and A. D. Ursul, "Strategiya adaptivnoy intensifikatsii selskokhozyaystvennogo proizvodstva" [The Strategy of the Adaptive Intensification of Agricultural Production], Kishinev, 1983.
13. Yu. K. Mitsek, "Robots in the Agroindustrial Complex," in the book "Robototekhnika i robotizatsiya proizvodstva" [Robotics and the Robotization of Production], Kishinev, 1984, p 84.

14. Ibid., p 91.

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## PATENTS AND INVENTIONS

## NEW LAW ON INVENTIONS, DISCOVERIES UNDER WAY

Moscow TRUD in Russian 13 Aug 85 p 2

[Interview with Deputy Chairman of the USSR State Committee for Inventions and Discoveries N. V. Mironov by a TRUD correspondent: "Stimuli for the Innovator"; date and place not specified]

[Text] The basis of the policy adopted by April (1985) CPSU Central Committee Plenum of intensifying our economy is the acceleration of scientific and technical progress. As was stressed at the conference in the CPSU Central Committee on this issue, the strategy of developing the scientific, technical and industrial potential is of paramount importance. Priority here is given to fundamentally new, revolutionary solutions. The need to significantly improve the conditions for the innovative and inventive activity of workers and to develop an economic mechanism, which ensures the widespread and rapid introduction of scientific and technical innovations into production, was also noted. The USSR Law on Inventions should become one of the important parts of such a mechanism. In accordance with party instructions work has begun on preparing a draft of this law. Deputy Chairman of the USSR State Committee for Inventions and Discoveries N. V. Mironov told a TRUD correspondent about it.

[Answer] Invention, in the broad sense of the word, that is, together with discoveries in the field of natural sciences and all scientific and technical solutions, is the technical and ideological basis of scientific and technical progress. Legal and economic questions concerning invention are regulated in our country by government decrees, particularly the Statute on Discoveries, Inventions and Efficiency Proposals, which was adopted by the Council of Ministers in 1973. Now the task has been posed to change over to regulating such questions at the level of an all-union law, which should increase the role and significance of the innovative activity of workers in the development of equipment and modern technology. The main and most important long-term norms, which specify the general direction of the legal regulation of invention, the tasks, rights and obligations of state and public organizations and enterprises in the development of the technical creativity of workers,



which ensue from the USSR Constitution, from the Law on Labor Collectives and from other party and government decisions, should be formulated in the law. The obligations of the soviets, ministries, departments and various organizations on providing the necessary assistance to inventors should, obviously, also be reflected in it.

The most important thing now is to develop a mechanism of legal and economic regulation, which will promote an increase of the interest of enterprises and organizations, on the one hand, and the individual inventor, on the other, in the most rapid and widespread introduction into the national economy of inventions, especially the most important, pioneering developments, which open new paths and directions in the development of equipment and technology. How can this be achieved? A significance increase of the role of moral and material factors has to be ensured and an efficient system of stimulation, which is free of formalism, has to be developed.

The question of a change in the existing unwieldy system of paying a reward, which is spoken of in many of the workers' letters, has also become urgent. In order to increase the effectiveness of this important stimulus it is necessary first of all to eliminate the large gap between the time of the development of the technical solution and the time of the payment of the reward for it. At present it sometimes costs the inventor great efforts to obtain the proper crediting and timely payment of the reward--too many documents and corroborations are required, it is necessary to wait a long time for the report, moreover, the author often does not know where his invention is being used.

An important direction in the preparation of the draft is the elaboration of measures on the effective protection of the rights and interests of the state, the inventors and the organizations, at which the inventions were developed. It is necessary to specify the measure of responsibility of organizations and officials for the violation of the exclusive right of the state to inventions, for the ill-timed use of inventions, for red tape and bureaucracy in resolving questions connected with their registration, introduction, the payment of the reward and so on.

At present it is, of course, too early to talk of concrete positions. But it is clear that the law should promote the more active involvement of workers in technical creativity and, thus, the more thorough and comprehensive use of the advantages of socialism in solving the problems of accelerating scientific and technical progress. The major role of the All-Union Society of Inventors and Efficiency Experts, which is mobilizing innovators for the acceleration of scientific and technical progress and is carrying out the public monitoring of the use of creative developments in production, should find reflection in it. For today the society has 13.5 million members, this is an enormous force.

The USSR State Committee for Science and Technology, our committee and the USSR Ministry of Justice together with the Central Council of the All-Union Society of Inventors and Efficiency Experts and the general public are carrying out work on the preparation of the draft of the USSR Law on Inventions. A working group for preparing the draft, of which famous inventors, efficiency experts, managers of patent services of enterprises and

organizations, scientists, lawyers and economists are members, has been established. Conferences are currently being held with workers of ministries, departments, enterprises and scientific research organizations. The letters and proposals from citizens and collectives are being review, the statements of mass media organs are being analyzed and the experience of other socialist countries is being studied. In short, everything necessary is being done to ensure that during the preparation of the draft of the law all proposals, which could foster the further development of invention in our country, would be taken into account.

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## INTERNATIONAL S&T RELATIONS

### HUNGARIAN INDUSTRIAL MANAGEMENT DESCRIBED

Moscow IZVESTIYA in Russian 22 Aug 85 p 5

[Article by IZVESTIYA correspondent S. Dardykin (Budapest): "Science and Cost Accounting"; under the rubric "Over Countries and Continents: A Creative Search for Friends"]

[Text] The aim of academic science is not cause for particular disputes. To be at the spearhead of progress and lay the foundation for tomorrow--that is its universally recognized vital mission. And the Central Research Institute of Chemistry of the Hungarian Academy of Sciences was created exclusively for the purpose of basic theoretical development.

Then, at the end of the 1960's, the new trends in the economy also penetrated the reverential silence of the institute's laboratories. It turned out that results capable of producing a concrete return already today were expected from large-scale science. Moreover, the complex situation which had in fact developed in the national economy did not allow basic research to be financed at the former pace. The academicians of the institute had to worry about furnishing some of the funds for future development themselves.

Such a prospect did not evoke a flood of enthusiasm. One could understand the venerable scientists. They, having set aside their favorite subject, a planned monograph, and having been diverted from promising experiments, had to begin monetary calculations. And do the profit, profitability, revenue and production costs (albeit scientific production) in general have anything to do with pure science? From their positions the young scientific associates, who had not yet earned a degree, echoed the honored colleagues. They ought to prepare dissertations, defend them and make a name for themselves in science, but have to be turned almost into plant engineers. However, both realized: owing precisely to its vanguard role academic science is capable of giving a powerful impulse to the economy. Ideas, which industry is ready to jump at, will surface precisely at the crest of basic research.

The example of the Korin family of [chemical] compounds, which was recently awarded the main prize at the Budapest International Trade Fair, is representative. In studying the structures of aqueous solutions, one of the institute's laboratories achieved results which promise great success in fighting corrosion. At that time the general director of the institute,

Academician Ferenc Marta, made the suggestion to link the data of the experiments with the needs of industry. As a result of 3 years of research a substance, whose addition, even in small doses, to ordinary water significantly increased the longevity of industrial heat exchangers and cooling systems, was obtained.

However, a successful experiment under laboratory conditions is one thing and large-scale production is quite another. The institute did not have its own capacities, while industrial technology, raw materials and commercial tests were needed for this. In other words, the partnership of production workers was needed.

It previously happened, scientific secretary of the institute Peter Winkler says, that for years scientists pushed their ideas into production. Since then the situation has changed. Oriented by the whole system of economic regulators toward the growth of exports and toward the search for new markets and competitive products, big industry is seeking an alliance with academic science. The director and leading specialists of the largest chemical enterprises are equal members of the institute's scientific council. And the case with Korin shows that the leaders of industry attend its meetings not for the sake of being marked present. No sooner had the first success emerged, when the Budapest Kaola Plant offered its financial participation and source materials. The Chemovil Cooperative Enterprise expressed its willingness to assimilate the production of the finish product, while the Tisza Chemical Combine was the first to volunteer to test extensively the domestic innovation, having rejected the usual imported agent. Others followed it. For years to come the institute obtained a reliable source of income in the form of a contracted percentage of the turnover.

The story of Korin is repeated practically word for word in the genealogy of substances which neutralize the adverse effect of herbicides on useful crops. The proceeds from the sale of patents for the new preparations will be a very opportune addition to the institute's funds. This year its expenditures will amount to about 170 million forints, only 50 million of which will come from the state budget.

Attempts to measure scientific labor quantitatively and qualitatively were also made earlier. Various theses, formulas and rating systems exist. Even a special branch of knowledge, which deals with the study of research work, appeared. Nevertheless, the collective of the Central Research Institute of Chemistry developed its own system and for several years now has been successfully using it in practice. All of the institute's activity--from the planning and financing of research work to the payment of bonuses--has been blended into a strict and well-balanced system.

The budget of each scientific division and laboratory consists of two parts. The first is formed by central allocations and is directly tied to the level of basic research, which is evaluated on the basis of the results of the last 3 years with allowance made for prepared dissertations, monographs, reports and publications in specialized journals and their repercussions in the scientific community. The second is called upon to make up the difference between the funds released from the state budget and the real needs and is

earned by the scientific subdivisions themselves. The most important thing, which I heard more than once whenever the talk turned to the ratio between basic and applied research, is to observe sensible proportions.

Whoever achieves the most significant results in "pure science," gets a chance to worry less about earnings on the side. Whoever does not cope with the plan of contractual work, may be threatened with a decrease in allocations for the following year. The group which worked on Korin, for example, is in an enviable position. One of the authors of the new preparation, Candidate of Sciences Erik Kalman, has eight foreign patents which were issued exclusively for the results of basic research. The head of the group, Gabor Palinkas, is the institute's unofficial title holder for scientific publications. And the group gets credit for all of this in the overall reckoning.

In principle, although this has not yet happened, the version, when a laboratory which runs idle can be disbanded and people and assets can be transferred to a more productive section, is possible.

One can see this particularly well in the distribution of the bonus fund. The primary goal here is to avoid wage leveling, while rewarding the practical contribution of each worker. It is necessary to break the long-standing tradition, when the bonus was a derivative of the salary and when it was considered natural that at the end of the year a doctor of sciences is presented a fatter envelope than a candidate of sciences. In the opinion of P. Winkler, in the wage itself an exaggerated role is assigned to the position held and the length of service.

In recent years the greater part of the bonus fund has been distributed among divisions, and then among the staff members on the basis of the same objective indices. About a third depends on participation in basic research and the rest depends on the effectiveness of applied research. By effectiveness there are implied the income and profit earned for the institute by filling the orders of industry. However, here, too, checks, which guard against the temptation to direct all efforts at contractual work, have been wisely provided for. At the institute they are also seeing to it that applied research would not be turned into day labor and would be worthy of large-scale science. The receipts from it are recorded not in net form, but with allowance made for the coefficient of the difficulty of the work.

The institute's roll for the thirteenth paycheck can communicate much. In one division the size of the annual bonus was more than 30,000 and in a neighboring one it did not reach 12,000. (For comparison: the monthly rate of an ordinary scientific associate with 10 years of service, which the majority at the institute are, is 7,000-8,000.) For a certain particularly diligent junior scientific associate the total sum is more than that of his senior colleagues from the same laboratory. But the main thing that is striking is that they, in whom basic science gets along with practice and, while bringing the future closer, does not forget the needs of today, prosper.

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## INTERNATIONAL S&T RELATIONS

### SOVIET-FINNISH S&T COOPERATION DETAILED

Moscow IZVESTIYA in Russian 12 Aug 85 p 4

[Article by IZVESTIYA special correspondent V. Shmyganovskiy (Helsinki-Moscow): "Through the 'Roof of the World' to the Stars"]

[Text] The Agreement on Scientific and Technical Cooperation Between the USSR and the Republic of Finland was signed 30 years ago, in August 1955. In the report, which we are published today, an account is given of several joint projects of scientists of the two neighboring countries and the work of the Academy of Finland.

Are the Pamirs visible from the shores of the Baltic? After a visit to President of the Academy of Finland Kay Otto Donner my doubts on this account, it seems, were dispelled. And in fact: scientists of Suomi can at our request immediately report: how the "Roof of the World" lives, whether its peaks beyond the clouds are growing and, on a broader plane, how our old woman of the planet is breathing in this region of the USSR.

"The point is," Mr Donner said, "that specialists of our countries are studying jointly the laws of dislocations and deformations of the earth's crust in the zone of the joining of the Pamirs and the Tien Shan Mountains. Finnish scientists have come three times to the Garm Testing Ground in Tajikistan with their instruments. By means of them it is possible to measure very accurately the distance between two points and to detect even negligible movements of the earth's crust, which amount here to up to 2 cm a year."

The Institute of Earth Physics of the USSR Academy of Sciences, which is in charge of this theme, have taken an interest in the participation of Finnish colleagues in the development of a basis for the checking of equipment. The new efficient instrument for the measurement of the length of waves of spectral lines--an interferometer which was developed by the neighbors--can also be of great benefit.

The interests of the two countries in the area of science are just as broad as, say, in the sphere of economics and technology. They encompass both basic research on astrophysics (the spectroscopy and structure of stars) and the problems of obtaining energy by means of a MHD (magnetohydrodynamic)

generator, the questions of the increase of fish stocks, the legal protection of inventions and so on.

And, the people who spoke with me stressed, the Agreement on Scientific and Technical Cooperation--the first in the history of states with a different social system--is playing a large role in all these relations.

Mr Donner got a folder of documents. The symbol was conspicuous: a picture of the mythical Greek hero Akademos, who gave the name to all similar organizations in the world. Within the round emblem the inscription: "The Academy of Suomi" surrounded the portrait.

"Here according to this protocol, on which agreement with the USSR Academy of Sciences was obtained, we confirmed our participation in a number of most interesting developments," K. O. Donner said. "We agreed to expand starting this year the exchange of scientists. We will strive for an increase of the time of the stay--especially of young researchers, who are leaving for the USSR and Finland for scientific work....."

"The research on the conversion of wood as a raw material for obtaining protein, for example," the scientist noted, "is extremely important for our 'forest' states. On the Soviet part a number of academic institutes are participating in it, Academician G. K. Skryabin is supervising the work. On the part of Finland these are the Institute of Microbiology of the University of Helsinki (Professor H. Gullenberg), the state center of scientific and technical research and other organizations."

This work, it must be said, is very promising. Its goal is to convert by means of the methods of biotechnology vegetable waste, including straw, sawdust, reeds and so on, into fodder for cattle, which is enriched with microbic protein. By means of special enzymes the cellulose in the waste is broken down into food glucose. A pilot plant, which makes it possible to enlarge the "menu" for animals, is undergoing laboratory tests at the Institute of Biochemistry and Physiology of Microorganisms of the USSR Academy of Sciences.

The project is very useful, but as far as the wood processing industry of Finland as such is concerned, in the opinion of K. O. Donner, insufficient capital is being allocated in the republic for research in this area. In general financing is one of the vital, and at times also "sore" problems of the academy, which by no means is autonomous. In Finland it is subordinate to the Ministry of Education. The academy does not have its own research centers. From the assets, which are allocated in accordance with the state budget, it supports scientific work at universities and institutes. The overwhelming majority of research is conducted in the laboratories of firms.

The parties are also sharing the results of their scientific cooperation with "third" countries, especially in such humane areas as medicine and health care.

A very important experiment--the combating of heart diseases at the earliest stage, the identification of children who are susceptible to them--is now under way in Finland.

"The extensive exchange of experience with Soviet colleagues is occurring here," Doctor Elizabet Helander, an associate of the academy, noted. "Medical research is linked with the joint research in the area of genetic engineering. It seems that, having solved the vital problems of health care, it is also possible to develop more successfully other areas of cooperation...."

Not only Moscow, but also Latvian and Kirghiz institutes, a Karelian institute and the Kola Affiliate of the USSR Academy of Sciences were on the list of Soviet scientific institutions, which K. O. Donner showed. For a small country, they told us at the Academy of Finland, the maintenance of contacts is very important, and we are satisfied with the business contacts with Soviet scientists. It is difficult, but also appealing to work on such an "assortment"--nearly 30 themes.

Finnish researchers have made considerable gains in the field of low-temperature physics and cryogenic engineering, here the schools of mathematicians, specialists in the field of the applied study of forests and biomedicine are traditionally strong. But the interests of the scientists of Suomi, as we see, are not confined to the framework of the traditions or possibilities of their country. They need both stars and the world of the atom, they want to listen to the breathing of the highest mountains.

"We are confident," K. O. Donner said, "that the extensive, diverse, I would say dynamic, scientific cooperation between the USSR Academy of Sciences and the Academy of Finland is benefiting and will benefit the peoples of both countries."

In the protocol on such cooperation, which was signed by Academician G. K. Skryabin, chief scientific secretary of the USSR Academy of Sciences, and the President of the Academy of Finland, I saw the following line: "The talks were conducted in the spirit of complete mutual understanding and friendship."

And it seemed: this is that case when diplomatic language says more for the mind and the heart than the most colorful words and comparisons.

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REGIONAL ISSUES

PRODUCTION INTENSIFICATION IN SOVETSKIY RAYON OF MOLDAVIA

Kishinev KOMMUNIST MOLDAVII in Russian No 8, Aug 85 pp 66-71

[Article by First Secretary of the Sovetskiy Rayon Committee of the Communist Party of Moldavia A. Demchenko: "Concern for the Acceleration of Scientific and Technical Progress"; passages rendered in all capital letters printed in boldface in source]

[Text] The fundamental acceleration of scientific and technical progress at the present stage of the building of communism is the general line of the economic policy of the CPSU and the main strategic lever of the intensification of the national economy. In essence the country should retool all the sectors of the national economy on the basis of the modern achievements of science and technology. This is the only means which is capable of increasing labor productivity, without which the further increase of the material and cultural standard of living of the Soviet people is impossible. Precisely for this reason the very intensification of social production has become the key problem of the further development of socialist society and a decisive prerequisite for the achievement of the most advanced scientific and technical positions and the highest world level of the productivity of national labor. It is natural that those people, who are developing new machines and instruments and new technology, should act as the pioneers of this revolutionary change. Hence, too, the attention which the communists of our rayon, in which there are many enterprises of that type, are displaying toward party decisions, especially the documents of the April (1985) CPSU Central Committee Plenum, which posed the questions of the acceleration of scientific and technical progress, the improvement of the management of the economy and the reform of the economic mechanism among the most important questions. Their topicality in many ways is due to the fast pace of scientific and technical progress, which has made our economic gains directly dependent on the time and scale of the assimilation of the achievements of scientific and engineering thought.

In the decree "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy," which was adopted by the CPSU Central Committee and the USSR Council of Ministers, and at the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress it was deemed necessary to expand the use of goal program planning. Including at the local level as well. It is a question of the fact that such programs should become a means of the acceleration of scientific and technical

progress. But for this it is necessary to manage them efficiently. A search for means and methods, which make it possible to stimulate this process, is underway in all the units of our party organization. If you take into account that the management of scientific and technical progress is concentrated mainly in the hands of central and republic organs, the complexity of party influence on its development at the rayon level becomes obvious. We found our own possibilities in the fact that from the large number of arising problems we singled out the main directions which are conducive to the intensification of production on the basis of the acceleration of scientific and technical progress. For this purpose the rayon party committee and the council of economic and social development, which operates under it, formulated and are implementing three goal programs which are designed for their accomplishment during the 11th Five-Year Plan: "The Program of the Acceleration of Scientific and Technical Progress and the Increase of the Organizational Technical Level of Industrial Enterprises"; "The Program of the Increase of Labor Productivity at Associations and Enterprises of the Rayon on the Basis of the Further Acceleration of Scientific and Technical Progress"; "The Program of the Increase of Product Quality at Industrial Enterprises of Sovetskiy Rayon for 1981-1985." A clear orientation toward the acceleration of the intensification of production is a peculiarity of them. The reference points are precise. The first is the increase of the technical and organizational level of associations and enterprises. The second is the efficient use of all types of resources and the scientific and technical potential. The third is the increase of product quality and the acceleration of the output of new items which conform to the best world models.

The results of the implementation of the programs testify that the basic goals set by them are being accomplished. In 4 years of the five-year plan at the enterprises 326 advanced technological processes were introduced, 24 mechanized lines were installed and 44 units of NC equipment, as well as 102 automatic and semi-automatic machines were put into operation. This step would have been less conspicuous, if the council of economic and social development had not developed and introduced in due time "The Territorial Comprehensive System of the Control of the Efficiency and Quality of Work." Owing to the use of systems forms and methods of the management of the development of the economy of the rayon positive results, which made it possible during its further improvement to increase party influence on all aspects of our public life, were obtained. Thus, so it appears to us, a system of the introduction of the advanced achievements of science and technology and the planning and organization of production in the rayon is being formed under the supervision of the party organization. And this is a new step in the matter of the combination and convergence of the sectorial and territorial principles of management.

The practice of formulating goal programs showed that the determination of the basic and ultimate goals is the most difficult thing in their formation. Taking this into account, we considered it necessary that the industrial enterprises would draft COMPREHENSIVE plans of their technical, organizational and social development for the five-year plan, relying on the preliminary calculations which had been made by the council of economic and social development, which operates under the rayon party committee. After analysis and approval by the appropriate ministries the plans are sent to this council,

which on their basis also specifies the goal programs. Thus, the opportunity is being created, first, to determine correctly the priority directions of the intensification of production and to link the gains being planned for enterprises more thoroughly with the tasks posed in the program documents of the party and, second, to overcome departmental isolation and to keep under control the measures which are most important by rayon standards.

The sharing of information on the best experience of the acceleration of scientific and technical progress as applied to our scale is one of the important sections of this work, which require coordination. Therefore, we regularly hold applied science conferences on these themes and meetings of the party and economic aktiv. Thus, at the conference on the acceleration of science and technical progress, which was held, for example, last year, the basic attention was focused on its planning and on the analysis of the influence of party supervision on its development and on the participation of the primary party organizations in this matter. It turned out that the party committees and the party buros are timidly intruding upon this sphere and are not seeing to it that the content of the comprehensive plans would be discussed in the collectives and that the results of their fulfillment would be regularly examined by party organs. Inadequate attention and poor organizing work are also leading to the low effectiveness of measures on the introduction of the achievements of science and technology. In fact at no enterprise of the rayon are there unified interconnected comprehensive plans which make it possible in a systems manner and with the use of the corresponding programs to solve problems with the greatest efficiency. The omissions of several republic ministries are also clearly visible here. The plans on new equipment are being delivered to enterprises with a significant delay, in a number of cases only with individual measures. The lack in them of long-term tasks does not enable the labor collectives to set for themselves substantiated gains for the 5-year period. A plant of the Moloko Association was built relatively recently in Kishinev. Only a few years of its operation have passed, but the technical equipment no longer satisfies the present requirements. Manual labor predominates in the presence of automated flow lines, 38 percent of the workers are employed in loading and unloading. The layout of the production premises does not make it possible to use either forklift trucks or containers. And it is difficult to hope for any improvement. But all the same it is necessary to do something. Life itself requires this. However, for the present nothing is envisaged in the immediate plans of the ministry.

In such cases only the program approach to the introduction of the achievements of scientific and technical progress can help. A new, higher stage of automation--the use of flexible machine systems (GAP's)--is beginning at a number of enterprises of the rayon. The creation of such complexes is the main means of intensive retooling. The task is difficult, much must be reorganized and created anew, but there is no other way out. Intensive work on the development of flexible machine systems is being performed at the Signal Plant. A good foundation for the changeover to the use of integrated production systems (IPS's) has been laid here. Office machinery and systems engineering are already now being used extensively in the functional divisions of the enterprise. The communists of the plant are actively participating in the development and introduction of advanced technologies and new equipment,

being the main nucleus of the creative collectives. The party committee has focused particular attention on the enlistment of young specialists in this important matter. The Komsomol committee has recommended for membership in the creative collectives the most capable and well-trained of them.

The Plant of Calculating Machines imeni 50-letiya SSSR has changed over to program and goal program forms and methods of the planning of scientific and technical progress. Here it is envisaged in the next 3 years to create several flexible machine systems, to automate designing and planning work and to introduce advanced technology. The party committee has elaborated measures on the ideological support of the program and has found means for the active enlistment of communists and local production collectives in its implementation. The experience of the plant was studied by the council of economic and social development and steps were taken for its dissemination at other enterprises of the rayon.

Here is another form of party work. The practical experience of the joint meetings of communists, who are developers of the Kishinev Scientific Research Institute of Electrical Instrument Making and engineering and technical personnel of the production and technical subdivisions of the Mikroprovod Scientific Production Association, is helping to create a common interest of people in creative work, to discuss in a practical manner and to find solutions in the assimilation of the new direction of the production activity of the association, which has begun to produce items of microelectronics.

The introduction of advanced technology is frequently the significant alteration of obsolete notions, the difficult surmounting of a psychological barrier and, at the same time, a radical change in the forms and methods of work. In the rayon small and medium enterprises, the majority of which have quite satisfactory production areas and the necessary number of personnel, make up 67 percent. However, their provision with modern equipment and their manning with an especially highly skilled regular labor force and experienced engineering and technical personnel are far from the current and especially the long-range requirements. The causes of the formed situation are various, but one of them is present everywhere--the dispersal of the assets being released for retooling. Ministries and departments do not always concentrate resources on the main directions, at times such amounts of money, which are barely enough just for separate partial solutions of technical problems, are released. Therefore, it is simply impossible to talk about a fundamental transition to a higher level of technical equipment. At the main enterprise of the Association of Folk Art Handicrafts of the Moldavian SSR Ministry of Local Industry all the means exist for its fundamental renovation, its provision with more advanced equipment and the active intensification of production. However, here they prefer to spend the assets on those measures which, in reality, do not increase its technical level.

Now a number of industrial enterprises of the rayon are also faced with important, responsible tasks in connection with the changeover to the new economic experiment. The first results of this work as a whole are reassuring. The rayon party committee has directed the attention of the party, trade union and Komsomol organizations of labor collectives to active participation in the intensive introduction of the achievements of scientific

and technical progress, since at the present stage the more effective mechanism of the introduction of new equipment should be studied. The plans of such introduction should become the same kind of law as the assignments on the production of output. Therefore, it is very important by means of a set of indicators and standards to aim people at the main thing--the utmost acceleration of the introduction of innovations of scientific and technical thought and their efficient use. However, not all economic managers and party leaders fully realize their role in the experiment being conducted. Highly productive imported equipment has been installed at the Pishchepromoformleniye Combine of the Moldavian SSR Ministry of the Food Industry, but it is not being used at full capacity. There are still many such cases, when a large amount of uninstalled equipment and what is known as equipment, "which has been under installation for a long time" and does not yield any return, is piling up at enterprises. The machine shift coefficient for the republic for the present does not exceed 1.3. For example, at the tire repair plant they are installing the new production equipment very slowly. It is still a long time until its placement into operation. In this connection the members of the People's Control had to impose fines on the managers of the enterprise. What is one to say about new equipment, if mismanagement reigns in the shops? Technical progress begins with order.

In the age of automation greater and greater inventiveness is required of man. No equipment will take upon itself the most difficult portion of mental activity--the creative portion. Consequently, we must now work most diligently precisely on this--we must develop the technical creativity of people. A good helper of the matter is the special-purpose creative brigades and collectives, which are now beginning to assume greater and greater importance. At the enterprises of the rayon such brigades and groups are being set up in nearly all the directions, in which new equipment and advanced technology are being introduced and the automation and mechanization of production processes are taking place. Such a form of the mass participation of engineering and technical personnel and workers in the development of scientific and technical progress is very, very promising. The point is that the labor of an engineer, who has an individual creative plan, is already insufficiently effective to yield a significant result. His creative capabilities are revealed more thoroughly, if he participates in a special-purpose group, brigade, which deals collectively with the introduction of new equipment and technology, which makes it possible to solve the posed problem more rapidly and with a higher degree of efficiency. The content of the individual creative plans of engineering and technical personnel is now assuming to a greater and greater extent and more and more often a formal nature, moreover, the personal plan of an engineer, who works in a creative collective, in essence duplicates the themes of this group. Moreover, not all young specialists, who have come to the enterprise soon after graduating from a higher educational institution, can immediately solve technical problems independently (and with each day they become more and more complicated!), within the creative brigade young people acquire more rapidly the skills which they need so much. Sociologists, when studying in the rayon the labor of engineering and technical personnel, during surveys received responses with 88 percent indicating a preference to work not according to individual creative plans, but within a collective.

In this connection the rayon party committee set the task to enlist during the next 2-3 years in the work of creative collectives up to 50 percent of all the engineering and technical personnel of industrial enterprises. We have all the grounds for this. For example, 111 creative collectives, in which more than 700 scientific and technical personnel and 250 workers are participating, are working at the Plant of Calculating Machines imeni 50-letiya SSSR. The participation of workers in collective scientific and technical creativity, which makes it possible to solve difficult technical problems purposefully, with great efficiency and more rapidly, is being rapidly developed and is becoming massive at the Mikroprovod Scientific Production Association, the Signal and Etalon plants, at the Moldbyttrikotazh Factory and other enterprises.

Of course, much is still hindering this. In recent times the prestige of engineering labor and, as a result, also its return have declined. It is very difficult to increase them, considerable time will be required for this. One will not solve the problem only by increasing the wage, even of such a category of engineering and technical personnel as process engineers and designers.

For the present the updating of equipment and renovation at a modern level are still not always profitable to the enterprise. And so that the labor collective would be interested in the introduction of new equipment, it should know the prospect of its use. Every enterprise and association is OBLIGED to have a long-term comprehensive program of the acceleration of scientific and technical progress, which is thoroughly coordinated and substantiated. It is necessary to concentrate the introduction of new equipment in the hands of one group, without dispersing these duties among various services. And what, perhaps, is most important, the assimilation of innovations should be included in the most important indicators of the enterprise, on the same level as those which reflect the production volumes and the increase of labor productivity, on which the material incentive funds, the development funds and so on depend.

It must be said that in 4 years of the 11th Five-Year Plan we were not able to completely solve several problems of the intensification of production and they require additional specification and coordination in "The Program of the Intensification of the Economy of the Rayon on the Basis of the Acceleration of Scientific and Technical Progress" for the 12th Five-Year Plan, which is being formulated by the council of economic and social development attached to the rayon party committee. The preparation of such a program is dictated by the increase of the competence of the party supervision of the economy and the increased level of organizing and political work in labor collectives. The comprehensive analysis of the urgent problems enabled the rayon party committee, the council operating under it, as well as the primary organizations to specify objectively the key problems of the further development of scientific and technical progress and the means of their solution.

In the documents of the April (1985) CPSU Central Committee Plenum and the materials of the conference on questions of the acceleration of scientific and technical progress, which was held in June in the CPSU Central Committee, the party presented clear, precise, sound measures on the changeover of the

national economy of the country to a new quality of development. And this is not only an economic, but also a priority social and political task, in the implementation of which all the units of our society should take part. The idea of the reform lies not only and not so much in obtaining new machines and technologies. The most advanced machine tool will remain dead, immobile metal, if the labor of man is not applied to it. People achieve scientific and technical progress. And its fate in the end is decided in the main production unit--the association, the enterprise. The reorientation of each of them, just as of sectors as a whole, is a vital necessity. That is why the main burden of the entire forthcoming campaign rests with the primary party organizations, which have to arouse, develop and use purposefully the creative energy and activeness of the workers. We see our task in stimulating this aspect of the activity of party collectives, which has now become the main aspect. To help to place personnel and communists properly, to increase the ideological support of the outlined transformation, to increase simultaneously the responsibility of the rayon soviet of people's deputies and People's Control organs in this matter.

The socialist competition under the motto "The Entire Increase of Production Volumes by Means of Technical Progress, the Maximum Utilization of Equipment and the Saving of Resources," which has been launched in the rayon, is also serving the goals of the intensification of production. The rayon party committee is aiming the organizing and political work of the primary party organizations at the unconditional fulfillment of the assignments, which have been outlined by the goal programs of scientific and technical progress, regarding them as a means of the increase of the intensification of production, which is conducive to the successful completion of the current five-year plan and the assurance of success during the next five-year plan.

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REGIONAL ISSUES

LITHUANIAN ACADEMY PRESIDENT ON S&T ACHIEVEMENTS, GOALS

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[Article by President of the Lithuanian SSR Academy of Sciences Academician Yuras Pozhela: "Science and Production"]

[Text] The decision on the organization of the republic Academy of Sciences was one of the first decisions of the government after the restoration of Soviet power in Lithuania. The war had interrupted the started work and had destroyed even the small experimental base for the development of science, which was available at the higher educational institutions of the republic. Immense work on the creation of a research base and the training of personnel of the highest scientific skills was required. All the progressive scientific intelligentsia of Lithuania actively joined in this work. With the all-round assistance and support of the Lithuanian CP Central Committee and the government of the republic, scientists of the USSR Academy of Sciences and other scientific centers of the country in a historically short time a mighty scientific organization--the Lithuanian SSR Academy of Sciences--was formed in the republic.

Today the republic Academy of Sciences unites large and mature scientific collectives which are capable of solving the most important problems of modern basic science and the use of its results in practice. At the Academy of Sciences 12 scientific research institutes and about 2,000 scientists, among whom there are more than 100 doctors of sciences and 900 candidates of sciences, are working productively. The collectives of the Academy of Sciences are making a significant contribution to the fulfillment of the tasks which were posed for science by the 26th CPSU Congress and the 18th Congress of the Communist Party of Lithuania and by the subsequent CPSU Central Committee plenums. Today the question of the more effective and active participation of the Academy of Sciences in the increase of production efficiency is being raised in an especially urgent manner.

At the April (1985) CPSU Central Committee Plenum the need for the scientific and technical updating of production and the achievement of the highest world level of labor productivity was emphasized as the most important priority task of the development of Soviet society. Revolutionary changes and the changeover to fundamentally new technological systems and to equipment of the latest generations, which provide the greatest efficiency, are needed. For



the accomplishment of these tasks it is necessary to organize the cooperation of the entire large production and personnel potential of the scientific institutions of the republic. Today in the Lithuanian SSR about 40,000 people work at scientific research organizations. Definite experience in solving the problems of the integration of science and production and the cooperation of the scientific and production potential of the republic has been gained at the Academy of Sciences.

### The Basic Sciences and Society

The creation of knowledge is a special and most important area of the activity of man. Knowledge is the most precious resource of man. The level of knowledge and the level of development of the basic sciences throughout the history of the existence of human society have determined the level of its cultural, intellectual and social development. The activity of statesmen and public figures and the prestige of countries and peoples are appraised in history according to the level of the support and development of the sciences and according to the names of the creative people who are the creators of new knowledge. The very concepts of reaction and progress are linked with the attitude toward the knowledge derived by mankind and toward the development of science.

Back at the beginning of the 20th century the creation of knowledge was a prestigious "pure" occupation which was divorced from practice. The 20th century made radical changes in the views of "pure" basic science.

The first socialist state in the world in its origination, development and everyday activity based itself and is basing itself on the most advanced science of society--Marxism-Leninism. For the first time in the history of mankind basic science became the basis of the practice of the government of society and became a requirement of the socialist state. On the other hand, the practical experience of developing socialist society enriched, as nothing else, basic science.

During the postwar period the growing scientific and technical revolution, which encompassed not only newer and newer areas of the economic activity of man, but also his daily life, stemmed not from individual successful technical solutions, but from the direct use of the results of the basic sciences in practice. In turn practice enriched, in all the senses of this multilevel word, science. Today the entire front of the basic sciences--the social, natural, technical and physical mathematical sciences--is linked comprehensively with practice. Production has become very science-intensive.

Now we do not imagine production without software, without computers, without new physical methods, without microprocessors, lasers, biotechnology, various new materials and robots, that is, the today of production is based on the achievements of the basic sciences and on the world level of basic knowledge. In this connection today the questions of the link of science with production are arising in a different way. Just recently we evaluated the practical activity of institutes according to how the results of their basic research are being introduced in production and the national economy. We fought for the policy: "from the idea to production." Today this is not enough. The

national economy requires not individual ideas, which have been developed at institutes, but the introduction in production of comprehensive works which are based on the achievements of world basic science. The policy: "the world level of knowledge into production" is needed.

In the republic there is a large detachment of scientists who are making a substantial contribution to the development of the basic sciences. To replenish the repository of human knowledge remains the main task which academic science is called upon to accomplish. But if we speak about the introduction of the results of basic science in practice, it is necessary to note that the size of the detachment of scientists of the republic comes to about 1 percent of the scientific army of the country. Therefore, even if all the scientific developments of the republic Academy of Sciences are introduced in the national economy of the republic, this will amount to only about 1 percent of the possibilities of the use of the achievements of modern basic science in practice. It is necessary to take the other 99 percent from the common repository of scientific knowledge and to use it for increasing the scientific and technical level of production. This, strictly speaking, is also being done by sectorial science.

But today, when precisely the achievements of the basic sciences have begun to stream into practice, sectorial science has been confronted with the need for the establishment of its own academies of sciences. But the establishment of its own academies is expensive and senseless, because the basic sciences develop according to their own laws, which do not coincide with the laws of the development of the sector. Therefore, the cooperation of sectorial science with academic science and science of the higher educational institution is the only means of pursuing the policy "the world level of knowledge into production." Today not only the institutes of the sectors, but also each industrial enterprise need multilevel scientific service on the part of basic science.

As we see, academic scientific research institutes and higher educational institutions should today act in a new capacity for them: they should serve practice with basic knowledge. Activity in this capacity requires the finding of effective forms of interaction with organizations of various departments and the creation of an experimental base for the empirical testing of scientific ideas. Below I will also dwell on the experience of the Academy of Sciences in the organization of the multilevel interaction of academic and sectorial institutes, higher educational institutions and industrial enterprises on the territory of the republic, which is making it possible to enlist the large scientific and production potential of various departments in the solution of the problems of scientific and technical progress in the national economy.

#### The Introduction of Scientific Developments in Practice

Economic contractual operations, which are performed in accordance with the orders of sectorial scientific research institutes and industrial enterprises, are the basic form of the introduction of the results of the basic research which is being performed at the institutes of the republic Academy of Sciences. During the latest period the amount of economic contractual

operations at academic institutes has increased from 6 million rubles a year on the average during the 10th Five-Year Plan to 10.4 million rubles in 1984. Here the average value of 1 economic contractual job increased by 1.7-fold and in 1984 came to 70,000 rubles. The annual economic impact from introduced developments during the 5-year period increased from 12.2 million rubles in 1981 to 26.0 million rubles in 1984, or by 2.1-fold. The revenues from economic contractual operations amount to 45 to 55 percent of the total financing of scientific research work.

The new technology and equipment, which were developed at institutes of the Lithuanian SSR Academy of Sciences, have become widespread in the country and are yielding a significant scientific and technical impact in the national economy.

The sensitive magnetic field detectors, which were developed at the Institute of Semiconductor Physics, for several years have been used in the milliteslameters, which are being series produced by industry, hydrostatic pressure gages are finding extensive use at enterprises of machine building. The ultra-high-speed pulse devices and microwave converters, which were developed at the institute and are being produced by its pilot plant, are being used at many organizations of science and the electronics industry.

The Institute of Mathematics and Cybernetics developed programs of automated control systems, the use of which in a number of union and republic ministries is yielding a significant economic impact. The institute is the main organization in the republic for programs of automated control systems in the Lithuanian SSR. The powerful academic system of the collective use of computers was developed on its basis.

The use of the results of the studies of the processes of heat transfer in flows of fluids, which were performed at the Institute of Physical Technical Problems of Power Engineering, is making it possible to increase the precision of the monitoring of the operation of nuclear reactors and to identify in good time the occurrence of damages.

The powerful laser device of the Institute of Physics is being used for the hardening and strengthening of metal working tools.

In the past 3 years laboratory buildings for the institutes of biochemistry and zoology and parasitology have been put into operation, which has led to the intensification of the work on the development of such new effective antileucocytotic and antitumor agents as pafentsil and ekhlobutid, which have been approved for extensive use.

An original device for the diagnosis of glucose in human blood, which has been readied for series production and will find extensive use in medical practice, was developed at the Institute of Biochemistry.

Staff members of the Institute of Botany performed a large set of operations on the problem of the study of the effect of weightlessness on the growth of plants for research on the Salyut space station.

One should dwell specially on the introduction of the developments of the Institute of Chemistry and Chemical Technology. The technologies of electroplatings, which were developed at the institute on the basis of major achievements in the basic research of electroplating processes, have been introduced at more than 820 large enterprises of the country, among which are such ones as the Volga Motor Vehicle Works, the Kama Motor Vehicle Works and other motor vehicle giants. In addition to the increase of the quality of corrosion-resistant electroplatings, the introduction of the technologies of the institute is yielding annually the decrease of expenditures directly in the production shops by more than 15 million rubles, not to mention the decrease of the foreign currency expenditures connected with the lack of the need to purchase a license. In 1980 a license was sold for the technology "noncyanide galvanizing in an alkaline electrolyte." Today the institute to a large degree is determining the standards of electroplating technology in all the machine building sectors of industry.

The success of the introduction of new technologies stems from the completeness of the developments of the institute, which are checked on a semiproduction scale at the pilot works of the institute. The information services of the republic have been enlisted in the introduction of the technologies of the institute. Interdepartmental laboratories and groups, which bring the technologies to their enterprises, have been formed at many enterprises of the country. Several ministries have established jointly with the institute model galvanizing works, which are the base works for the sector with respect to the introduction of new technologies. A school and seminars for the training of specialists in the new electroplating technologies operate at the institute.

The work experience of the Institute of Chemistry and Chemical Technology was endorsed by the Presidium of the USSR Academy of Sciences and was recommended for extensive dissemination at all the institutions of the USSR Academy of Sciences and the academies of sciences of the republics. In 1984 the prize of the USSR Council of Ministers was awarded to a group of staff members of the institute under the supervision of Corresponding Member of the USSR Academy of Sciences and Academician of the Lithuanian SSR Academy of Sciences Yu. Matulis--Academician of the Lithuanian SSR Academy of Sciences and Doctor of Chemical Sciences R. Vishomirskis; Candidate of Chemical Sciences P. Dobrovolskis, deputy director; Doctor of Chemical Sciences A. Bodnevas, chief of a laboratory; Candidates of Chemical Sciences M. Mitskus, R. Sharmaytis, Yu. Vegis, S. Yakobson and A. Petrauskas--for a set of technological developments in the area of galvanizing, nickel plating, chrome plating and conversion coatings and their introduction in production.

#### The Forms of Cooperation of Scientific Industrial Organizations in the Republic

A quite stable system of the coordination of scientific research work exists in the republic, and republic programs on the most important problems of scientific and technical progress in production have also been formulated. The scientific collectives of the Academy of Sciences are taking part in the work on 23 all-union, 10 republic and 7 interdepartmental programs. The programs coordinate the activity of institutions of various departments,

thereby contributing to the acceleration of the performance of research. At the same time the practical experience of performing work on programs shows that insurmountable difficulties, which are due to what are called "interdepartmental barriers," frequently arise at the final stage of the introduction of a development in production. At this stage the coordination of work should be supplemented by the organization of the mutually advantageous cooperation of institutions of various departments and the enlistment of a broader group of design specialists directly from production.

Good conditions for the organization of effective cooperation have formed in the republic in such an important sector of the national economy as radioelectronics. In 1981 the Elektronika Scientific Production Complex, which unites four sectorial science research institutes, two institutes of the Academy of Sciences, Vilnius State University, Kaunas Polytechnical Institute and four plants, was organized on the initiative of republic Academy of Sciences.

The program of the scientific production complex is the automation and robotization of production with the use of computers and the development of new items of semiconductor and radioelectronic engineering. The chairman of the Council of the Elektronika Scientific Production Complex is Secretary of the Lithuanian CP Central Committee Comrade A. Brazauskas.

The scientific production complex was established not as a temporary collective for the solution of a specific problem, but as a permanent alliance of specialists, physicists and mathematicians, on the one hand, and, on the other, engineers of the developers and producers of radioelectronic equipment for the accomplishment of the tasks of the development of new items with the highest parameters and the tasks of today on the automation and robotization of production at enterprises and organizations of the radioelectronic and electrical engineering type on the territory of the republic. This alliance is based on the powerful research, production and technological subdivisions of scientific research institutes and plants and academic institutes, which mutually complement each other. It is necessary to say that few even central institutes with such a powerful and universal base and personnel composition of specialists as has been united in the Elektronika Scientific Production Complex will be found.

In the 3 years of its existence the scientific production complex has carried out more than 100 developments, which provided just at the organizations belonging to the scientific production complex a saving of more than 5 million rubles. At present 16 major assignments are being fulfilled, among which there are such ones as the development of an automated control system and microprocessor means of the control of the production of picture tubes at the Panevezhis Ekranas Plant and television equipment at the Shyauliyay Television Plant imeni 40-letiya Sovetskoy Litvy, the increase of the quality and technical level of the production of televisions, the development of specialized integrated circuits and semiconductor sensitive elements (sensors) for machine tool building and electrical equipment enterprises, the development and introduction of the computer-aided designing of radio measuring and electronic equipment, the development and production of new

radioelectronic equipment for the purposes of medical diagnosis and others. The work performed at the Elektronika Scientific Production Complex does not conclude with the production of individual mockups and prototypes, but is brought up to the pilot production of small series. The Vilnyale-2 and Vilnyale-3 microcomputers with programs, which were developed by the joint efforts of the Institute of Semiconductor Physics, the Institute of Mathematics and Cybernetics, sectorial institutes and the Shyaulay Television Plant, are operating in the shops of enterprises.

The efficiency of the cooperation of academic institutes with other organizations of the Elektronika Scientific Production Complex is due to the specialized plants, which have been set up in the republic and operate in close cooperation with institutes of the Academy of Sciences. These are the plant of specialized microcomputers and semiconductor instruments attached to the Institute of Semiconductor Physics, the Pilot Plant of Laser and Electronic Equipment attached to the Institute of Physics and, finally, the Experimental Plant of Programs and Assemblies of Computerized Instruments attached to the Institute of Mathematics and Cybernetics. The main peculiarity of these enterprises is very high scientific support. Not only scientists of the highest skills from the patron institute, but also the sectorial institutes and design bureaus of the enterprises of the Elektronika Scientific Production Complex, at which the production development and optimization of the most complicated assemblies of products of the plants are carried out, are participating in it. Such cooperation is making it possible to develop the most complicated scientific instruments and semiconductor devices and high-quality programs. These enterprises have actually become enterprises of the catering by science to the needs of the national economy. The products of the plants are used not only at the enterprises of the republic, first of all the members of the Elektronika Scientific Production Complex, but also at many enterprises and scientific institutions of the Soviet Union.

Today socialist production requires of science not only industrial technology, but also comprehensive scientific service in the solution of the problems of economic and social development. The Academy of Sciences jointly with the Shyaulay City Party Committee and City Soviet Executive Committee organized the comprehensive service by science of the production and educational organizations of the city with the participation of all the academic institutes. Sociologists, botanists, power engineers, physicists, economists, historians, parasitologists--all found use for themselves. About 50 laboratories of practically all the institutes of our academy performed over 150 operations at the most different levels. Interdepartmental laboratories and groups, which are making a substantial contribution to the increase of the standards of production and labor productivity, were set up at enterprises of the city. The economic impact from the introduction of the developments of scientists of the Academy of Sciences comes to more than a third of the entire economic impact which was obtained by industry of the city from the introduction of new equipment. The cooperation of the Academy of Sciences with the city encompasses not only technical areas, but also such areas as the study of the history of the city, sociological studies, flower growing and landscaping, the reduction and monitoring of environmental pollution and others. Personnel of the highest skills--candidates and doctors

of sciences--are being trained at the Academy of Sciences for the higher educational institutions and enterprises of the city.

#### The New Tasks

The experience of organizing the multilevel cooperation of the scientific, design and production organizations of various departments in the republic shows that the effectiveness of such cooperation is governed by two basic factors. The first factor is the active participation of party and soviet organs in the organization and supervision of interdepartmental coordinating organizations, which operate as a voluntary service under the scientific supervision of institutes of the Academy of Sciences. The second factor is the establishment of professional interdepartmental laboratories and works in the region, which are specialized in fields of science, and not sectors of production. Precisely the production subdivision-plants under the scientific supervision of academic and other scientific and design organizations of the republic have become the decisive unit which is insuring the service by science of all the organizations of the region.

The experience of the Elektronika Scientific Production Complex is now being carried over to other sectors of production, which govern scientific and technical progress. The Vibrotekhnika Scientific Production Association is already in operation and the Lazery and Galvanotekhnika associations have been organized. There is no doubt that the new associations will contribute to the solution of the problems of introducing a modern level of knowledge in the production technologies of enterprises of the republic and thereby will make a substantial contribution to scientific and technical progress.

In speaking about the problems of introducing scientific achievements in practice during the next five-year plan, it is necessary to note that the implementation of the statewide program of the creation, the development of the production and the efficient use of computer technology and automated systems for the period to 2000, which was approved by the CPSU Central Committee, will be of particular importance. Microprocessors and microcomputers will find extensive use on the job, at planning and design organizations, in scientific research, in management and daily life. Not only specialists of the exact and technical sciences, but also the specialist of any field of science or production should be prepared for such a changeover of the national economy. We have to admit that the era of personal computers is not in the distant future, but today, and we are obliged to change radically the style of our everyday work and our thinking. The problems of eliminating "computer illiteracy" today have become very urgent. They are at the center of attention of mathematicians and cyberneticists of the Academy of Sciences and will require great efforts for their solution.

Mainly the problems and experience of the organization of the relations of institutes of the exact and technical sciences with industrial enterprises and scientific research institutes were discussed above. In reality the problems being discussed concern all the specialties and all the collectives of the Academy of Sciences. The institutes of the biological type have actively joined in the work on the implementation of the Food Program and on

comprehensive cooperation with agricultural, as well as medical science. Today the qualitative reorganization of research in the direction of the increase of fundamentality in the area of the economic sciences is especially important.

In the speech of Comrade M. S. Gorbachev and the statements of the participants in the conference, which was recently held in the CPSU Central Committee, the acceleration of scientific and technical progress was specified as the main issue of party economic policy. Science is heading the front of scientific and technical progress, and this requires, as was noted at the conference, the resolute turn of science toward the solution of the problems of social production and, what is no less important, the turn of production in the direction of science. This means that the process of the integration of science and production should be accelerated. The finding of even more effective means of the development of basic and applied research and the strengthening of the production base of science will be required. The reorganization of the system of the coordination and planning of scientific research in the republic in the direction of the changeover from the coordination to the planned cooperation of research organizations for the solution of the problem of the development of science and scientific and technical progress in production will be required. The qualitative intensification of the cooperation of scientific research institutes (academic and sectorial) with higher educational institutions of the republic both in questions of the development of scientific research and its experimental base and in questions of the improvement of the training of personnel will be required. The thorough comprehension of the problem of the acceleration of scientific and technical progress and the search for the best means for their solution should be at the center of attention of all scientific and production organizations of the republic. The collectives of the Academy of Sciences have the necessary forces for the accomplishment of the tasks, which the party is setting for science, and will greet the 27th Communist Party Congress with new achievements in the acceleration of scientific and technical progress.

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## REGIONAL ISSUES

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## UKRAINIAN PRODUCT QUALITY CONTROL SYSTEMS

Moscow STANDARTY I KACHESTVO in Russian No 8, Aug 85 pp 4-6, 48

[Article by N. Z. Ponomarenko, chief of the Ukrainian Republic Administration of the USSR State Committee for Standards: "Territorial Product Quality Control Systems and the Problems of the Acceleration of Scientific and Technical Progress"]

[Text] The role of standardization as one of the forms of the management of social production is increasing immeasurably in our times, when vast work has been launched in our country on the reform of the mechanism of administration and management in connection with the realization of the concept of the acceleration of the socioeconomic development of the country on the basis of scientific and technical progress, which was formulated at the April (1985) CPSU Central Committee Plenum.

In the report of M. S. Gorbachev at the conference in the CPSU Central Committee on 11 June 1985 on questions of the acceleration of scientific and technical progress it was indicated that in conformity with this concept associations and enterprises should be given the opportunity to earn for themselves the assets, which are necessary for the increase of the technical level of production and product quality and social development, and to dispose of them independently. In other words, the solution of many cardinal problems of the increase of production efficiency and work quality should be transferred from the upper echelons directly to local organizations. And this requires, on the one hand, the strengthening of territorial methods of the management of the national economy and, on the other, the intensification of all types of operations which are connected with the development and the increase of the role of standardization as an important extradepartmental lever of centralized management.

In this connection it is appropriate to note that in the materials of the November (1982), April (1984), March and April (1985) CPSU Central Committee plenums, as well as during the meetings of M. S. Gorbachev with the party and economic aktiv of Moscow, Leningrad and Kiev the need to aim all the efforts of statewide organs at the solution of the problems, which are of key importance for the country, and to turn their current concerns over to lower sectorial or local organizations was indicated.

For this purpose, as is known, a number of steps aimed at giving enterprises and associations more rights and freeing them from excessive guardianship of the center have been taken.

However, the enterprises, which are acquiring greater and greater independence, are naturally beginning to display greater interest in the sources of manpower and energy resources of their own region, as well as its network of the production and social infrastructure. All this is dictating to a much greater extent than before the need for the coordination of the goals, tasks and efforts of labor collectives within the region.

In this connection it is important to note that at the present stage of the development of Soviet society qualitatively new regional means of promoting the development and intensification of production have appeared. These are, first, the quite specific experience of some labor collectives or others in the use of the achievements of science and technology and in the methods of accelerating the process of the advance of valuable innovations along the chain, the initial link of which is "science," while the final link of which is "production," second, the experience in streamlining production and organizational and management work and, third, the experience in the use of social levers of the acceleration of the economic, scientific and technical development of production.

If we are able to ensure the integration on the scale of the region (oblast, city, rayon) of the experience of using these new sources of the development of society, having given it the appropriate organizational methods orientation and form, we will obtain a new control factor of great intensity. The practical experience of the use in the largest socioeconomic centers of the Ukraine, for example, Kiev, Donetsk, Dnepropetrovsk, Lvov, Odessa and a number of other oblast centers and cities, which have a highly developed scientific and industrial potential, of territorial systems of the control of the quality and efficiency of work, the formation and functioning of which are based on the use of the means and methods of standardization, is also evidence of this.

Thus, according to all customary canons, the task of accelerating scientific and technical progress is, first of all, within the competence of ministries and departments, which establish for associations and enterprises the corresponding plan assignments on the assimilation of new equipment, dictate technical policy, organize the sharing of experience among related collectives and so on and so forth. But then in 1975 the first territorial control system in the Ukraine was established in Berdyansk and it turned out that the region (city) settles more efficiently and even more thoroughly than the sector does many questions which are connected with the acceleration of scientific and technical progress. The latter may seem debatable, but here one should take into account the fact that the territorial system (TS) drastically intensifies with the region intersectorial information and the intersectorial sharing of advanced technical, organizational, economic and social experience. Moreover, a unique "bank" of ideas and efficiency proposals and a "bank" of materials, which interpret advanced practical experience in a scientific methods manner, are being created here.

For confirmation of what was said above let us cite the following example. The Berdyansk Yuzhgidromash Plant was the first in the city (and in Zaporozhye Oblast) to begin to use NC machine tools extensively. At first the workers could not rejoice enough: you have no confusion with the production of parts and no nervous strain when turning products over to the technical control division: you put in the machine tool the tape with the necessary program, positioned the billet, time passed, now remove the finished part, which was made in the desired dimensions, with the necessary degree of precision and roughness. But after a while applications with the request to be discharged began to be received by the personnel division from these workers. The basic reason for these applications is the unwillingness to be "an errand boy" by a machine tool.

This example attests that frequently a technical gain can turn into a substantial social loss. At any rate, when the problem is solved not comprehensively, but by the implementation of isolated measures which are not interconnected enough.

The people of the Yuzhgidromash Plant long ago eliminated the made mistakes: a specific integral policy was formulated for the assurance of the successful solution of the problem of the retooling of production and the increase on this basis of the quality and reliability of their products. Its implementation enabled the collective to win the right to call itself "Enterprise of High Product Quality," which is granted in our republic by the Ukrainian SSR Council of Ministers and the Ukrainian SSR Council of Trade Unions on the basis of the representation of the Ukrainian SSR State Committee for Labor and the Ukrainian Republic Administration of the USSR State Committee for Standards.

Interpreting their experience in a scientific methods manner, the workers of the Yuzhgidromash Plant in 1981 prepared and publicly defended what is called a "collective dissertation," which became a good guide for other collectives which were beginning the retooling of their works. Within the framework of the territorial system other leading enterprises of the city also prepared and defended "collective dissertations"--each on one of the most urgent themes of the acceleration of scientific and technical progress and the intensification of production.

It seems that to a significant extent owing to such integration of advanced know-how, moreover, integration on an intersectorial regional basis, the collectives of industrial enterprises annually win for their city Challenge Red Banners of the CPSU Central Committee, the USSR Council of Ministers, the All-Union Central Council of Trade Unions and the All-Union Komsomol Central Committee.

The certification of the organizational and technical level of production for the purpose of determining its conformity to the present requirements and identifying and using the available reserves of the increase of the achieved level has been acquiring greater and greater development in recent years in the republic within the territorial systems.

At present the experience of the collective of the Dnepropetrovsk Combine Plant imeni K. Ye. Voroshilov in the certification of workplaces, which was endorsed by the CPSU Central Committee, is well known. In this connection it is possible to note that the Ukrainian Republic Administration of the USSR State Committee for Standards, back before the practice of the Dnepropetrovsk combine builders was given positive mention at the December (1983) CPSU Central Committee Plenum, took steps on the study, generalization and dissemination of the experience of the leading enterprises of Dnepropetrovsk Oblast, which within the comprehensive system of the control of product quality and the efficient use of resources (KS UKP i EIR) began to conduct on the broadest scale the certification of technological processes, primary production collectives (shops, shifts, brigades) and workplaces.

It is necessary to emphasize that such certification, as practical experience shows, is necessary even where, it would seem, the level of the performance of all operations is quite high. For example, at the Dneprovskiy Machine Building Plant imeni V. I. Lenin (Dnepromash) the development of technology is carried out in the process of the active dialogue of the process engineer-developer with the computer of the specialized computer center, into the memory of which all the standard processes and standard solutions, which are envisaged by the set of state standards of the Unified System of the Technological Preparation of Production, as well as by the enterprise standards, which reflect very efficiently in their requirements the recommendations of sectorial and large-scale science, are fed. Nevertheless, a procedure, in conformity with which the mandatory certification of the technological process is carried out half a year after the start of the output of one item or another, has been established here. And in 30 cases out of 100 new interesting and more effective technical solutions mature during this time among engineers and workers. After the performed adjustment of the process it is recertified after a year and, as a rule, is again enriched in some way owing to creative research and new scientific and engineering solutions. Should it be said that the plant computer center, which takes all these suggestions and changes into account, accordingly also increases its "skills."

Apparently, there is no need to depict in some special way to the readers of the journal the Rovno Territorial System, since it was described in sufficient detail during the coverage of the All-Union Conference on the Theme: "The Experience of the Development and Introduction of Territorial Systems of the Increase of Production Efficiency and Work Quality," which was held in Rovno.<sup>1</sup>

For understandable reasons in the publications of the journal particular attention was devoted to the experience of the experimental formulation and use of regional (city) standards. Therefore, today, apparently, an account should be given of the fact that in 1985 in the process of implementing the decisions and instructions of the March and April CPSU Central Committee plenums a set of 23 territorial standards "The Management of Scientific and Technical Progress," which regulate the basic principles of this management, the organization of the work of the commission for the promotion of scientific and technical progress in industry, the planning of scientific and technical progress at industrial enterprises of the city, the method of evaluating the level of scientific and technical progress at industrial enterprises of the city and so on, was put into effect in Rovno.

Let us examine in somewhat greater detail the above-named method of evaluating scientific and technical progress. The very process of formulating an integral indicator of the level of scientific and technical progress requires prior analysis--to what extent each of the components of production conforms to the present achievements of scientific and technical progress. Therefore, a system of the certification of the organizational and technical level of production is being introduced in Rovno. The results of the certification are reflected on a matrix chart, in which a list of the basic technological processes (sand casting, investment casting, chill casting, stamping, forging and so on) runs from the left in a vertical column, a stage-by-stage breakdown of each process (sand casting: the production of cores, the melting of metal, chipping and so on) is given in the horizontal lines.

Each of the stages is rated subject to the degree of conformity to the achievements of scientific and technical progress. For example, the melting of metal, which is carried out in combustion furnaces, is 0.1 point. Melting, which is carried out in electric furnaces and cupolas, but with a low level of the mechanization of the loading of the burden, is 0.3 point. If in case of the same melting the loading is mechanized, then it is 0.5 point. Melting in induction furnaces is 0.7 point. Melting in induction furnaces with the complete automation of the process of melting and loading is 0.9 point and so on.

A rating of 0.7 point and higher is designated "success," and the corresponding square in the matrix chart is painted red. A rating of 0.5-0.7 point is a satisfactory state and is indicated in blue. A rating of less than 0.5 point--"old-fashioned methods"--is yellow.

As a result a visual cartogram of all production, in accordance with which at first glance the worker, the foreman, the director and any outsider see the weak and strong points, is obtained. Hence the formulation of a more precise, aimed policy of capital investments when carrying out the retooling and renovation of production, the subject reference lists for inventors, efficiency experts and the collective creative search for methods of undoing what are called "bottlenecks" and the corresponding position of the organs of the USSR State Committee for Standards, say, when settling the question of the possibility of the stable output of products with the State Emblem Quality.

In recent times regional and plant Quality Programs, which are aimed at the realization of the demand of the CPSU Central Committee on bringing Soviet products up to the highest world levels, have been formulated with the active support of the USSR State Committee for Standards and its local organs within a number of territorial control systems.

Such programs are being formulated at 50 enterprises and associations of Sumy Oblast. First they study here to what extent one product or another is needed for the further development of scientific and technical progress, in what quantities and at what qualitative level. Then they model the set of demands, so to speak, on the ideal item, which have not yet been achieved in either domestic or foreign practice. Finally, the corresponding possibilities of one labor collective or another to realize these demands are determined.

For example, at the Sumy Elektron Production Association they determined: 47 percent of the bringing of electron microscopes of the transmitting group up to the highest scientific and technical level depends on the implementation of new scientific, technical and design developments, 31 percent--on the improvement of technology and 22 percent--on the components and the materials being used. Having scrupulously broken down each of these figures, the people of Sumy determined what work the collective of the Elektron Production Association is capable of performing on its own and in what the assistance of the sector, related industries and the Ukrainian SSR Academy of Sciences is needed. In accordance with the results of the analysis a three-version program of the development of production with different combinations of expenditures on retooling, renovation and the development of the scientific research base was formulated. But in all the versions the achievement of the highest scientific and technical level of the output being produced in not more than 7 years (1984-1990) was taken as the starting point.

It is necessary to note that the formulation of similar Quality Programs at enterprises and associations of the oblast was carried out in an enterprising manner, without the corresponding "pressure" of the sectors. In this case the region, that is, the territorial methods of control of production efficiency and work quality, including the methods of control of the processes which are aimed at the intensification of the operations connected with the acceleration of scientific and technical progress, played the leading role.

The results of the past decade make it possible to draw a quite specific conclusion: the rate of the development of production and the improvement of the quality indicators of work was without doubt higher where sectorial control was substantially supported by territorial control, which is based on the utmost development of standardization. Dnepropetrovsk Oblast, where standardization "horizontally," that is, the use of joint enterprise standards by collectives of related enterprises, underwent extensive development, can serve as an example of this.<sup>2</sup> As is known, a territorial-sectorial scientific production mining and metallurgical complex, which was established on the basis of the joint enterprise standards and includes more than 50 enterprises of the mining, byproduct coke and metallurgical industry, as well as the corresponding scientific research and planning and design organizations, is operating efficiently here. The complex of forestry engineering enterprises of Ivano-Frankovsk Oblast, which have proven themselves not only by a high product quality, but also by a high degree of the absence of production waste, is operating very efficiently on the same basis.

On the basis of the examples of Kiev, Dnepropetrovsk Oblast, Rovno, Berdyansk and other regions, where territorial systems have been established, it is possible to trace an interesting feature of the mechanism of their action. By drawing broad strata of workers into the process of the management and, what is especially important, the self-management of production, the territorial systems in the majority of cases use "informal" methods of management very effectively, thereby enriching the arsenal of regional means of influence on the efficiency and quality of the work of the leading collectives. Moreover, it is a question not simply of strengthening, but precisely of

intensification, when by small forces, as a rule, without any significant material expenditures they achieve quite impressive results.

Here it is necessary to bear in mind the following circumstance. Under the conditions of the scientific and technical revolution and mature socialism the moral and psychological climate of the collective and the possibilities of the creative self-expression and social activeness of workers, their occupational advancement, all-round information, the arrangement of daily life and the organization of cultural leisure are becoming important factors of the increase of production efficiency. Within the territorial systems if not all, then many of the factors listed above are put into effect. Here enterprises, organizations and institutions of not only the production infrastructure, but also the social infrastructure (health care institutions, children's preschool institutions, personal service, trade) perform the role of unique and very influential "allied suppliers" of industrial enterprises. As a result the return from the use of fixed production capital increases precisely at the enterprises of industry, the main attention and forces of which are concentrated on the solution of problems which are of fundamental importance for the further scientific and technical development of the production base.

In this sense an example from the practice of Volyn Oblast is significant. At the beginning of the 10th Five-Year Plan it held a far from honorable place in the output of products with the Emblem of Quality (17th). By the end of the 10th Five-Year Plan it had slipped even lower--23rd place.

At the very beginning of the 11th Five-Year Plan a detailed and sound article entitled "Is It Far From Lutsk to Rovno?" appeared in the republic newspaper PRAVDA UKRAINY. In it there was an analysis of the practice of using comprehensive product quality control systems and territorial systems in these oblast centers, which are separated by a distance of only 8-10 km. Whereas in Rovno, having taken as a basis the Lvov and Berdyansk systems (comprehensive product quality control systems and territorial systems), they immediately began to improve them and enrich them with their own practical experience, in the neighboring oblast center, having formally copied the statutes and methods of the people of Lvov and Berdyansk, they did not, as they say, breathe new life into them.

At present Volyn Oblast (its oblast center is Lutsk) is rapidly improving the quality of its work: in the output of products of the highest quality category the oblast has already achieved a level which considerably exceeds the average republic level. As a consequence, in accordance with the results of the fourth year of the five-year plan Lutsk was awarded the Challenge Red Banner of the CPSU Central Committee, the USSR Council of Ministers, the All-Union Central Council of Trade Unions and the All-Union Komsomol Central Committee.

It is clear to everyone that the people of Lutsk could not have made a spurt in 2-3 years by means of the radical improvement of the technical basis of their own works. The level of the use of this base is another matter. Here much changed for the better.

The Volyn Oblast Party Committee recommended for the position of chief of the Lutsk City Committee a resourceful, energetic engineer who has much experience

in party organizing work. The Lutsk City Party Committee addressed to the Ukrainian Republic Administration of the USSR State Committee for Standards the request to provide procedural assistance in the improvement of the territorial quality control system. In response to this request a mobile thematic exhibition of the Exhibition of Ukrainian SSR National Economic Achievements, the Ukrainian SSR Council of Scientific and Technical Societies and the Ukrainian Republic Administration of the USSR State Committee for Standards was sent to Lutsk. A most interesting seminar of party workers, economic managers and the aktiv of the scientific and technical societies of the city was held on the basis of this exhibition, which revealed the features of the most efficient and effective territorial systems. Moreover, not only the people of Lutsk themselves, but also specialists on territorial systems from Kiev, Rovno and Berdyansk, as well as Belorussian colleagues, particularly from Brest, with which Lutsk is competing, spoke at the seminar.

A very efficient system of the management of the socioeconomic processes of the development of the city, which in many ways is similar to the Rovno one, is now operating in Lutsk.

The experience of the successful solution of the problems of increasing production efficiency and work quality in the industrial sphere of regions naturally suggested the idea of its more extensive and active use in agricultural production. The people of Lvov, Kherson and Rovno became the pioneers in this matter. This work was especially stepped up after the adoption of the Food Program: at many oblast and rayon agroindustrial associations they saw in the development and use of joint enterprise standards and regional standards the opportunity to coordinate efficiently the efforts of the collectives of enterprises and organizations of different departmental subordination.

The Ukrainian Republic Administration of the USSR State Committee for Standards, the Ukrainian SSR Center of Standardization and Metrology, the Committee for Quality and Standardization of the Ukrainian SSR Council of Scientific and Technical Societies and the Republic Board of the Society for Knowledge drew up a program of the provision of scientific, procedural and propaganda assistance to several regions of the republic in the establishment of comprehensive systems of the control of product quality and the efficient use of resources in agricultural production (KS UKP i EIR-"Selkhoz"). In conformity with this program a model set of standards of the Selkhoz Comprehensive Product Quality Control System was developed on the basis of a number of kolkhozes and sovkhozes of Rovenskiy and Goshchanskiy rayons of Rovno Oblast. It is necessary to note that in Rovno Oblast, as in Lvov Oblast, a rather good "reserve" of experience of using standards of an organizational methods nature for the purpose of ensuring in agricultural production greater order, discipline and responsibility for work quality existed back before the adoption of the Food Program.

The experience of the Rovno Zarya kommunizma Kolkhoz is well known in the republic and in the country. Enterprise standards have been used successfully at this kolkhoz since 1978, an efficient comprehensive system is operating on their basis. At the farm there is a metrological service, which operates on the basis of complete self-sufficiency and is yielding a significant economic



impact. In Rovno Oblast the annual certification of the production, technical and livestock veterinary level of stock farms is being carried out not for the first year on the basis of the regional standard of the oblast territorial system.

An original form of agroindustrial integration exists in Lvov Oblast. Thus, at many kolkhozes of the oblast their own industrial shops, which on the basis of economic contracts and joint enterprise standards are insuring the production of individual assemblies and parts for industrial enterprises of Lvov, have been set up for the purpose of the more efficient use of manpower resources and the attachment of manpower to the countryside. The work of these shops is planned so that the amount of products, which the industrial enterprises need, would be produced before the start of field operations. It is necessary to note that the quality of the performance of work by the collectives of such shops is, as a rule, high and completely satisfies the most exacting requirements of the client industrial enterprises.

In conclusion it is necessary to note that in the Ukrainian SSR there is already a certain arsenal of efficient means and methods of the systematic increase of production efficiency and product quality. This is instilling confidence that their skillful use everywhere will make it possible to accomplish with honor the new, more responsible tasks which the 27th CPSU Congress will pose for workers of the city and countryside.

#### FOOTNOTES

1. See STANDARTY I KACHESTVO, No 12, 1985; Nos 2, 4, 1985.
2. See A. A. Mironenko, "Scientific Methods Questions of the Formulation of Joint Enterprise Standards," STANDARTY I KACHESTVO, No 12, 1981.

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## CONFERENCES AND EXPOSITIONS

### KIEV CONFERENCE ON REPUBLIC COMPREHENSIVE S&T PROGRAM

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 8, Aug 85 pp 93-94

[Article by V. Borisov and P. Popov: "The Organization of the Formulation of the Republic Program of Scientific and Technical Progress"]

[Text] The conference-seminar of the scientific secretaries of the problem commissions of the Interdepartmental Scientific Council for Problems of Scientific, Technical and Socioeconomic Forecasting attached to the Presidium of the Ukrainian SSR Academy of Sciences and the Ukrainian SSR State Planning Committee was held in Kiev on 14-15 February 1985. The questions of improving the formulation of the Comprehensive Program of Scientific and Technical Progress and Its Socioeconomic Consequences for 1991-2010 for the Ukrainian SSR were examined at the conference. Candidate of Economic Sciences S. I. Doroguntsov, deputy chairman of the Interdepartmental Scientific Council and chairman of the Council for the Study of Productive Forces of the Ukrainian SSR of the Ukrainian SSR Academy of Sciences, delivered the report "On the Tasks of the Problem Commissions of the Interdepartmental Scientific Council on the Increase of the Quality and Efficiency of the Formulation of the Sections of the Comprehensive Program of Scientific and Technical Progress and Its Socioeconomic Consequences for 1991-2010 for the Ukrainian SSR." In the report it was emphasized that at the present stage of the development of the socialist economy the role of forecasting and the long-range planning of the development of the entire national economic complex is increasing significantly. The speaker emphasized the need for the assurance in the comprehensive programs of a new approach to the technologies being developed. The elaboration of forecasts of the retooling of all sectors of physical production, especially the base sectors, and the orientation of the forecasts toward the leading introduction of resource-saving technologies are the most important tasks of the problem commissions. In conclusion, the speaker dwelled on the questions of the organization of the work on the Comprehensive Program of Scientific and Technical Progress for the Period to 2010. The steps, which have been taken in recent times on the strengthening of the problem commissions, and the scientific forces, which have been enlisted in their work, make it possible to count on the successful accomplishment of the tasks which have been assigned to these commissions.

I. M. Suzyy, chief of a department of the Ukrainian SSR State Planning Committee, delivered the report "Urgent Questions of the Improvement of the

Use of Developments for the Future in the Practice of National Economic Planning." The great importance of the substantiation of the prospects of the development of the national economic complex of the republic was noted in the report. The comprehensive programs, which have been formulated for the period to 2000 and 2005, are being used by the republic state planning committee when formulating the five-year plans. It is very important to bring the comprehensive program as close as possible to the elaboration of specific planning decisions. The inclusion in the problem commissions of workers of the republic State Planning Committee is a positive factor which should favorably affect the formulation of the comprehensive program of scientific and technical progress. This will make it possible to unite scientific foresight fundamentally with specific economic experience and to use the forecasts of the development of the national economy to the utmost when drawing up national economic plans.

The role of the republic comprehensive program as a component of the union program was covered in the report "Republic Comprehensive Programs in the System of the Comprehensive Program of USSR Scientific and Technical Progress" of Candidate of Philosophical Sciences S. A. Petrovskiy, scientific secretary of the Scientific Council for Problems of Scientific, Technical and Socioeconomic Forecasting of the USSR Academy of Sciences and the USSR State Committee for Science and Technology and chief of a sector of the Central Institute of Economics and Mathematics of the USSR Academy of Sciences. The republic programs are augmenting substantially the sectorial sections of the union program and are contributing to the more specific formation of the long-term trends of development of the economy of the country with allowance made for the specific features of each union republic. The republic comprehensive programs were included for the first time as regional sections in the Comprehensive Program of USSR Scientific and Technical Progress for 1986-2005. It is important to insure the great detailing of developments for the next five-year plan. With respect to all the sections of the comprehensive program it is necessary to strive for the uniformity of the structure, since great difficulties arise when drawing up consolidated forecasts. The importance of establishing closer contacts of the republic problem commissions with the corresponding commissions of the union scientific council was also emphasized.

The urgent questions of the organizational and procedural improvement of the formulation of the comprehensive program for the period to 2010 were covered in the report "The Procedural Principles of the Forecasting of the Development of the National Economic Complex of the Republic Within the Framework of the Formulation of the Union Comprehensive Program of Scientific and Technical Progress" of Doctor of Economic Sciences Professor Yu. P. Lebedinskiy, scientific secretary of the Interdepartmental Scientific Council and deputy chairman of the Council for the Study of Productive Forces of the Ukrainian SSR of the Ukrainian SSR Academy of Sciences. The preparation of the basic directions, from which the most important questions, including intersectorial and interdisciplinary questions, have to be singled out, is the most important stage of the formulation of the comprehensive program of scientific and technical progress. The end results of the formulation of the comprehensive program depend on the quality of this work and on the efficient coordination of actions among the problem commissions and the coperforming organizations. Much also has to be done for the coordination of research within the

individual sections of the program. After dwelling on the questions connected with the formulation of the regional sections of the comprehensive program, the speaker noted that the elaboration of the prospects of the solution of specific problems, which are characteristic of the given region and which are of great importance for the national economy of the republic and the country as a whole, should become the main content of these sections. The specification of the list of these problems is the most urgent task of the corresponding problem commissions.

Doctor of Economic Sciences Professor G. M. Dobrov, chairman of the Scientific Council of the Ukrainian SSR Academy of Sciences "Systems Studies of the Organizational and Management Problems of Science and Technology" and deputy chairman of the Council for the Study of Productive Forces of the Ukrainian SSR of the Ukrainian SSR Academy of Sciences, delivered the report "Technological Problems in the World Forecasts and Realities of the Present Scientific and Technical Revolution." In the report it was noted that at present all the industrially developed countries of the world are right on the verge of the objective need for the complete changeover of the entire production system to a modern technological base. The essence of this process is to insure in the historically shortest time the updating of the production system of all sectors of physical production. The conducting of scientific research work on the development of technological processes with the use of flexible automated systems and their introduction in the practice of economic activity are the priority direction in the accomplishment of this task.

Doctor of Technical Sciences Professor A. A. Korennoy, chief of a division of the Council for the Study of Productive Forces of the Ukrainian SSR of the Ukrainian SSR Academy of Sciences, and Candidate of Technical Sciences V. V. Segal delivered reports on the methods of socioeconomic forecasting and on the forecasting of the appearance and implementation of fundamentally new technologies which are being developed on the basis of goal-oriented basic research.

The reports of the scientific secretaries of the problem commissions of the Interdepartmental Scientific Council for individual problems, which are connected with the organization of the work on the preparation of the sections of the comprehensive program, were also heard.

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## AWARDS AND PRIZES

### BALTIC REPUBLICS AWARD STATE PRIZES IN S&T

#### Lithuania

Vilnius SOVETSKAYA LITVA in Russian 20 Jul 85 pp 1, 2

[Article: "On the Awarding of the 1985 Lithuanian SSR State Prizes in Science, Technology, Literature and Art"]

[Excerpt] The Lithuanian CP Central Committee and the Lithuanian SSR Council of Ministers, having considered the representations of the Committee for Lithuanian SSR State Prizes in Science and Technology and the Committee for Lithuanian SSR State Prizes in Literature and Art, resolve to award the 1985 Lithuanian SSR State Prizes to:

#### In Science and Technology

Doctor of Physical Mathematical Sciences R. Baltrameynas, acting professor of the Chair of Semiconductor Physics of the Physics Faculty of Vilnius State University imeni V. Kapsukas, Doctor of Physical Mathematical Sciences V. Bareyakis, chief of the Laboratory of Fluctuation Phenomena of the Institute of Semiconductor Physics of the Lithuanian SSR Academy of Sciences, Doctor of Physical Mathematical Sciences A. Reklaitis, director of the Sector of High Frequency Instabilities of this institute--for the series of works "Nonequilibrium Collective Phenomena in Semiconductors" (1974-1984).

Doctor of Physical Mathematical Sciences G. Pragarauskas, senior scientific associate of the Institute of Mathematics and Cybernetics of the Lithuanian SSR Academy of Sciences, Doctor of Physical Mathematical Sciences D. Surgailis, director of a sector of this institute--for the series of works "Studies of Controlled Markov Processes and Fields" (1969-1984).

S. Balchyunas, chief of a sector of the Kaunas Scientific Research Institute of Radio Measuring Technology, V. German, chief of a scientific research sector of the Vilnius Scientific Research Institute of Radio Measuring Instruments, Candidate of Technical Sciences E. Gudelyavichyus, chief of a department of the Kaunas Scientific Research Institute of Radio Measuring Technology, Doctor of Technical Sciences Professor G. Zhintelis, chief of the Chair of Computers of Kaunas Polytechnical Institute imeni Antanas Sniechkus, Candidate of Technical Sciences P. Kanapyatskas, acting docent of the Chair of

Computers of this institute, Candidate of Technical Sciences E. Karchyauskas, docent of the Chair of Software of this institute, V. Lapidus, chief of a scientific research department of the Vilnius Scientific Research Institute of Radio Measuring Instruments, Candidate of Physical Mathematical Sciences K. Ryakyavichyus, director of the Kaunas Scientific Research Institute of Radio Measuring Technology, Candidate of Technical Sciences V. Starikov, director of the Vilnius Scientific Research Institute of Radio Measuring Instruments--for the development and introduction of methods and means of the computer-aided designing of modern radio measuring equipment (1974-1984).

A.-V. Byankunskene, chief of an experimental laboratory of the Yesya Experimental Plant of Artistic Ceramics, G. Vayshvilene, senior foreman of the shop of bone china, R. Gyanis, chief engineer, I.-Yu. Lamauskayte, artist, F. Savitskas, chief of the laboratory of bone china, K. Sadzyavichyus, chief of the shop of souvenir ceramics, L. Timleris, director, L. Sheryalene, deputy chief process engineer of this plant, Candidate of Technical Sciences V. Yasyukyavichyus, docent of the Chair of Technology of Silicates of Kaunas Polytechnical Institute imeni Antanas Sneckus--for the development and introduction in production at the Yesya Experimental Plant of Artistic Ceramics of the technology of majolica, rock compound and bone china on the basis of local quartz and aluminosilicate raw materials.

Candidate of Technical Sciences A. Yochis, docent of the Chair of Theoretical Radio Engineering of Kaunas Polytechnical Institute imeni Antanas Sneckus, Candidate of Physical Mathematical Sciences R. Krivitskas, docent of this chair--for the textbook "Osnovy teorii tsepey" [The Fundamentals of Circuit Theory] (Vilnius, "Mokslas", 1980).

B. Bleyzgis, manager of a group of the Republic Planning Institute for Land Management, A. Botirene, chief soil scientist of this institute, Doctor of Agricultural Sciences Professor M. Vaychis, director of the Lithuanian Scientific Research Institute of Forestry, Candidate of Agricultural Sciences Y.-P. Kyanstavichyus, chief of the Laboratory of Forest Management and Forest Assessment of this institute, V. Melisyakas, chief of the Kaunas Cartographic Department of the Republic Planning Institute for Land Management, Candidate of Agricultural Sciences A.-Yu. Rutkauskas, chief of a forest management party of the Lithuanian Forest Management Enterprise of the Lesproyekt All-Union Association, V. Skuodzhynas, director of the Republic Planning Institute for Land Management, Candidate of Agricultural Sciences Yu. Yuodis, chief soil science agronomist of this institute, A. Yuozokas, chief soil science specialist of this institute--for the series of works "The Study and Large-Scale Mapping of the Soils of the Lithuanian SSR" (1951-1984).

Doctor of Medical Sciences Professor A. Martsinkyavichyus (supervisor of the work), chief of the Chair of General Surgery and Anesthesiology of the Medical Faculty of Vilnius State University imeni V. Kapsukas, Doctor of Medical Sciences E.-V. Barkauskas, docent of this chair, First Deputy Minister of Health Candidate of Medical Sciences A. Grishkyavichyus, G.-A.-K. Dirse, surgical physician of the First Department of Cardiovascular Surgery of the Vilnius City Clinical Hospital, Candidate of Medical Sciences A. Dranenko, surgical physician of this department, Candidate of Medical Sciences E. Kosinskas, assistant lecturer of the Chair of General Surgery and

Anesthesiology of the Medical Faculty of Vilnius State University imeni V. Kapsukas, Candidate of Medical Sciences P. Paulyukas, senior scientific associate of the Problem Laboratory of Cardiovascular Surgery of this faculty, Candidate of Medical Sciences D. Triponene, senior scientific associate of this laboratory, Doctor of Medical Sciences V.-Y. Triponis, docent of the Chair of General Surgery and Anesthesiology of the Medical Faculty of Vilnius State University imeni V. Kapsukas--for the series of works "The Achievements in the Diagnosis and Surgical Treatment of Diseases of Vessels at Vilnius State University imeni V. Kapsukas" (1963-1983).

Candidate of Veterinary Sciences Yu. Pechyulis, docent of the Chair of Plant Physiology and Microbiology of the Faculty of Natural Sciences of Vilnius State University imeni V. Kapsukas--for the textbook "Mikrobiologiya" [Microbiology] (Vilnius, "Moslas", 1983).

Doctor of Economic Sciences K. Antanavichyus, professor of the Chair of the Management and Organization of Construction of the Vilnius Institute of Civil Engineering--for the series of works "The System of the Preparation of Efficient Comprehensive Sectorial Plans: Methodology and Mathematical Economics Models" (1973-1984).

Doctor of Philosophical Sciences Professor R. Pavilenis, chief of the Chair of the History of Philosophy and Logic of Vilnius State University imeni V. Kapsukas--for the monographs "Yazyk. Logika. Filosofiya (analiz sovremennykh logiko-filosofskikh kontseptsii yazyka)" [Language. Logic. Philosophy (An Analysis of Modern Logical and Philosophical Concepts of Language)] (Vilnius, "Mintis", 1981) and "Problema smysla" [The Problem of Meaning] (Moscow,.....,

#### Latvia

Riga SOVETSKAYA LATVIYA in Russian 21 Jul 85 pp 1, 3

[Article: "On the Awarding of the 1985 Latvian SSR State Prizes"]

[Excerpt] The Latvian CP Central Committee and the Latvian SSR Council of Ministers, having considered the suggestions of the Committee for Latvian SSR State Prizes in Science and Production attached to the Latvian SSR Council of Ministers, the Latvian Republic Council of Trade Unions and the Committee for Latvian SSR State Prizes in Literature, Art and Architecture attached to the Latvian SSR Council of Ministers, resolve:

To awarded the 1985 Latvian SSR State Prizes to:

In Science and Production

1. Doctor of Philological Sciences Elza Yanovna Kokare, chief of a department of the Institute of Language and Literature imeni A. Upit of the Latvian SSR Academy of Sciences, supervisor of the work, Candidates of Philological Sciences Karlis Yanovich Arays, Oyar Voldemarovich Ambaynis, Alma Yanovna Antselane and Yadviga Boleslvovna Darbiniyetse, senior scientific associates of the same institute, Anna Aleksandrovna Feldkhune, senior editor of the Zinatne Publishing House of the Latvian SSR Academy of Sciences--for the

academic publication "Latyshskiye narodnyye pesni. Trudovyye pesni" [Lettish Folk Songs. Labor Songs], Vols 1-5 (1979-1984).

2. Doctor of Historical Sciences Lyubov Yakovlevna Zile, director of the Institute of Party History attached to the Latvian CP Central Committee, supervisor of the work, Candidate of Historical Sciences Elmar Yanovich Pelkaus, chief of a sector of the same institute, Doctor of Historical Sciences Vintsent Yuryevich Karalyun, director of the Institute of History of the Latvian SSR Academy of Sciences, Doctor of Historical Sciences Aleksandr Danilovich Pedosov, deputy director for scientific work of the Institute of Marxism-Leninism attached to the CPSU Central Committee, Doctor of Historical Sciences Bruno Arvedovich Toman, senior scientific associate, Candidate of Historical Sciences Nikolay Aleksandrovich Barsukov, deputy director of the editorial office of a department, workers of the same institute, Candidate of Historical Sciences Zinaida Vasilyevna Dukhanova, docent of the Latvian State University imeni P. Stuchka, Candidate of Historical Sciences Yuliy Yuliyovich Spruzh, docent of the Riga Medical Institute, Doctor of Historical Sciences Konstantinas Zenonovich Surblis, deputy director for scientific work of the Institute of Party History attached to the Lithuanian CP Central Committee, Doctor of Historical Sciences Yuožas Yuožovich Yermalavichyus, scientific secretary, Corresponding Member of the Lithuanian SSR Academy of Sciences Romas Yakovlevich Sharmaytis-Romaytis, consulting senior scientific associate, workers of the same institute, Candidate of Historical Sciences Galina Ivanovna Volkova, chief of a sector of the Institute of Party History attached to the Estonian CP Central Committee, Doctor of Historical Sciences Iogannes Ioganovich Yakobson, senior scientific associate of the same institute--for the monograph "Postroyeniye sotsializma v Sovetskoy Pribaltike. Istoricheskiy opyt kompartiy Litvy, Latvii, Estonii" [The Building of Socialism in the Soviet Baltic Region. The Historical Experience of the Communist Parties of Lithuania, Latvia, Estonia], which was published in 1982.

3. Candidate of Technical Sciences Gleb Nikolayevich Kotovich, docent of Riga Polytechnical Institute imeni A. Ya. Pelshe, supervisor of the work, Konstantin Sergeyevich Komarov, graduate student, Candidate of Technical Sciences Yazep Yanovich Lochmelis, docent, Andris Yanovich Mentsis, Candidate of Technical Sciences Gariy Sigizmundovich Stanke, Mikhail Aleksandrovich Usanov, senior instructors, workers of the same institute, Candidate of Physical Mathematical Sciences Nikolay Kirillovich Dovchenko, Candidate of Technical Sciences Vladislav Fedorovich Lamekin, deputy director for scientific work of the same institute, Yuris Pavlovich Andersons, senior engineer of the Riga Telegraph and Telephone Station, Yan Yanovich Sikсна, chief of a production laboratory of the same station--for the work "A Set of Means of Digital Optical Fiber Communication With Delta-Modulation."

4. Candidate of Technical Sciences Yanis Yanovich Nagla, docent of Riga Polytechnical Institute imeni A. Ya. Pelshe, supervisor of the work, Candidates of Technical Sciences Petr Antonovich Savelyev and Aleksandr Antonovich Tsars, docents of the same institute, Rudolf Yekabovich Tsiyeminsh, mechanical engineer (posthumously)--for the textbook "Osnovy teplotekhniki" [The Fundamentals of Heat Engineering], which was published in 1981 (2nd



edition), and the textbook "Teplotekhnicheskiye raschety v primerakh" [Heat Engineering Calculations in Examples], which was published in 1982.

5. Candidate of Medical Sciences Olaf Yuliyevich Urdis, chief of a department of the central scientific research laboratory of the Riga Medical Institute, supervisor of the work, Doctor of Medical Sciences Lazar Izraylevich Yavorkovskiy, Doctor of Biological Sciences Igor Aleksandrovich Pushkarev, Candidates of Medical Sciences Dina Karlovna Bondare, Dayna Vladimirovna Grasmene, Aleksandr Grigoryevich Merson, Yelena Vladimirovna Poddubnaya, Dusya Yakovlevna Solovey and Zoya Filippovna Terebkova, senior scientific associates of the same laboratory, Doctor of Technical Sciences Khaïm Borisovich Kordonskiy, chief of a chair of the Riga Red Banner Institute of Civil Aviation Engineers imeni Leninskogo komsomola--for the elaboration of the epidemiology and pathogenesis of hemoblastoses and the introduction in practice of methods of their diagnosis, treatment and prevention.

6. Candidate of Biological Sciences Velta Yanovna Zvirgzdine, chief of a laboratory of the Botanical Garden of the Latvian SSR Academy of Sciences, Candidate of Agricultural Sciences Layma Yanovna Gutmane, senior scientific associate, Candidate of Biological Sciences Gundega Yanovna Mutseniyetse, junior scientific associate, workers of the same Botanical Garden, Doctor of Biological Sciences Rikhard Yazepovich Kondratovichs, professor of the Latvian State University imeni P. Stuchka--for the introduction, selection and development of the technology of breeding new decorative plants and their introduction in commercial production.

7. Candidate of Technical Sciences Ernest Vikentyevich Vevers, chief of a department of the Latvian Scientific Research Institute of Farming and Agricultural Economics, Candidate of Agricultural Sciences Zigrīda Pavlovna Daye, senior scientific associate, Candidate of Agricultural Sciences Mirdza Petrovna Ozole, chief of a sector, Candidate of Economic Sciences Vladimir Grigoryevich Stroganov, director, Corresponding Member of the Latvian SSR Academy of Sciences Kazimir Albinovich Shpogis, former deputy director for scientific work, workers of the same institute, Candidate of Physical Mathematical Sciences Yanis Yazepovich Bichevskiy, docent of the Latvian State University imeni P. Stuchka, Candidate of Economic Sciences Marger Arturovich Gayss, Candidate of Agricultural Sciences Lutsiya Boleslavovna Reynfeld, chiefs of departments of the republic planning and surveying station of the chemicalization of agriculture, Agita Adolfovna Pavule, deputy chairman and chief of the Administration of Agrochemical Service of the Latselkhozkhimiya Scientific Production Association, Ayna Karlovna Nuke, chief agronomist of the Valkskiy Rayon Agroindustrial Association, Anita Vilkhelmovna Zhibinko, senior agronomist of the Priyekule Experimental Breeding Station, Visvaldis Voldemarovich Skunsh, chairman of the board of the Nauksheny Kolkhoz of Valmiyerskiy Rayon, Doctor of Agricultural Sciences Petr Donatovich Barbalis (posthumously)--for the development and introduction in agricultural production of the "Soil-Harvest" Information-Computer System.

8. Corresponding Member of the Latvian SSR Academy of Sciences Vladimir Vitalyevich Pirogov, chief of a laboratory of the Institute of Electronics and Computer Technology of the Latvian SSR Academy of Sciences, supervisor of the work, Candidate of Technical Sciences Sergey Feliksovich Gaysterov, senior

scientific associate, Aleksandr Yevgenyevich Alasheyev and Pavel Aleksandrovich Grishanov, chiefs of groups, Vyacheslav Ivanovich Kobenko and Viktor Vasilyevich Poberiy, chiefs of laboratories, workers of the same institute, Lyudmila Vladimirovna Belyakova, chief physician of the outpatient clinic of the Fourth Administration of the Latvian SSR Ministry of Health, Solomon Grigoryevich Itskovich, chief physician of Hospital No 2 of the same administration, Ingrida Tomovna Blume, chief of a pharmacy, Vladimir Mikhaylovich Boboshko, senior engineer, Yuris Yanovich Vetsvagars, chief of a laboratory, workers of the same hospital, Vladimir Ivanovich Udalov, electrical engineer (posthumously)--for the work "Problem-Oriented Distributed Systems of Data Processing on the Basis of Minicomputers and Microcomputers."

9. Vilnis Yanovich Auzin, Oyar Yanovich Ole and Yan Valdovich Empelis, chief designers of the Riga VEF Production Association imeni V. I. Lenin, Roland Yuryevich Bander, chief of a department, Khugo Vilgelmovich Belitskiy, deputy technical director, Aleksey Ignatovich Bekhter, design engineer of category I, Galina Mikhaylovna Grineva, regulator of the 6th grade, Aldis Khugovich Zitsmanis, director for production, Edvin Robertovich Kreslinsh, deputy chief of a department, Dodi Grigoryevich Lapin, deputy technical director, Georgiy Petrovich Shekov, chief of production, Atis Osvaldovich Urbatsans, chief of a bureau, workers of the same association--for the development and introduction in large-series production of a general-purpose standardized design and technological complex for the efficient production under the conditions of flexible automated manufacturing systems of electronic communication systems, specialized computer hardware and data transmission equipment.

10. Candidate of Technical Sciences Edgar Karlovich Lachgalvis, director of the Latvian Scientific Research Institute of the Mechanization and Electrification of Agriculture, Candidate of Technical Sciences Arvid Arnoldovich Vilde, director of a laboratory, Candidate of Technical Sciences Ayvar Kharaldovich Tsesniyek, director of a sector, Uldis Eduardovich Pinnis, senior scientific associate, Yuris Paulovich Moritis, acting director of a department, Candidate of Technical Sciences Vasiliy Petrovich Ustinov, director of a department, Leonid Petrovich Yansons, chief designer, Petr Ivanovich Yakushev, tractor driver, workers of the same institute, Karlis Karlovich Vayvars, chief engineer of the Uzvara Kolkhoz of Bauskiy Rayon, Dmitriy Vasilyevich Kmin, director of a laboratory of the Baltic State Zonal Machine Testing Station, Yanis Avgustovich Podinsh, chief of the Main Administration of the Mechanization and Electrification of Agriculture of the Latvian SSR Ministry of Agriculture, Yevgeniy Yevgenyevich Dolbe, deputy chairman of the Latvian SSR State Committee for the Supply of Production Equipment For Agriculture--for the development and introduction in agricultural production of a set of tilling machines, the efficient ganging and effective use of powerful high-horsepower high-speed tractors of high traction classes (T-150K, K-700, K-700A and K-701).

Estonia

Tallinn SOVETSKAYA ESTONIYA in Russian 19 Jul 85 pp 1, 2

[Article: "On the Awarding of the Estonian SSR State Prizes for Outstanding Works in Science, Technology and Production, Literature, Art and Architecture and for Outstanding Successes in Labor, Which Were Achieved in Socialist Competition"]

[Excerpt] The Estonian CP Central Committee and the Estonian SSR Council of Ministers have adopted a decree for outstanding works and successes in work, which were achieved in socialist competition, and in connection with the 45th anniversary of the founding of the Estonian SSR to award the Estonian SSR State Prize to:

I. In Science, Technology and Production:

P. G. Kard (manager of the collective), N. N. Kristofel, L. Kh. Sossi, V. G. Fedoseyev--for research on the theory of laminated optical systems.

O. Yu. Sammal (manager of the collective), V. I. Kits, R. A. Mikhkelson, Ya. A. Oyarand, A. A. Rulkov, I. I. Sits, A. G. Vendelin--for the development and introduction of a new method and a microprocessor complex for the monitoring of the quality of concrete and reinforced concrete components.

T.-A. A. Sulling (manager of the collective), Ya. E. Ekha, T. I. Kask, A. A. Kivik, T. O. Keebi, R. Kh. Lay, Ya. A. Maarooos, V. Yu. Melder, R. V. Teesal, M. Ya. Tiyvel--for the diagnosis and surgical treatment of chronic ischemic heart disease.

V. P. Makarov (manager of the collective), T. A. Adler, K. E. Antye, G. S. Borisova, R. O. Vil, A. A. Vunk, K. K. Vyayarsi, Yu. K. Oll, M. V. Zalashko, R. R. Kippar, T. E. Tammik--for the development and introduction in production of a biotechnology for the conversion of whey into a protein and vitamin compound for the improvement of the balancing of fodders.

P. R. Veygel, A. U. Volmer, R. Yu. Didyk, A. M. Karasev, P. V. Koydo, Kh. Yu. Kruus, P. F. Kreutsberg, R. Kh. Pakosta, A. A. Pikhlaak, P. A. Redchits, A. D. Sorokin, A. P. Feofanov--for the introduction of the series erection and preparation of components of 16-story apartment houses.

O. A. Avasta, A. A. Kirm, K. A. Kikas, M. Ya. Kaazik, L. P. Link, V. V. Agurayyuya, A. K. Loomyagi, R. K. Laur--for the development and introduction of new highly efficient equipment for the prevention of the pollution of waters of the basin of the Baltic Sea with waste petroleum products and oils of small fishing vessels of the Estrybakkolkhozsoyuz.

K.-P. P. Annus, M. F. Kadushin, M. Yu. Kasela, A. A. Koolmeyster, Yu. A. Kraft, I. F. Kyopere, F. P. Lindvere, M. E. Luksepp, R. R. Seepter, L. P. Silland, N. D. Steynberg, K. O. Symermaa--for the development, the organization of the series production and the extensive introduction of means of transportation and mechanization aids of the workplaces of sewing flow

lines at enterprises of light industry, including in case of the complete mechanization of the Sangar Flow Line Factory.

Kh. A. Aarna, M. E. Altosaar, V. E. Valdna, Yu. A. Varvas, T. R. Varema, M. I. Krunks, P.-E. L. Kukk, E. Ya. Mellikov, Y. V. Palmre, Ya. V. Khiyye, A. I. Epik, A. Ya. Erm--for the study of the chemistry of defects in A<sub>2</sub>B<sub>6</sub> semiconductors and the development of optoelectronic components on their basis.

L. E. Valdma (manager of the collective), P. K. Kallas, Ya. P. Kyubarsepp, Yu. A. Kyuttis, Yu. Yu. Pirso, Kh. P. Rokhtla, Ya. M. Saarse, E. E. Khinno--for the development of highly erosion-resistant sprayers of liquid fuel made from tungsten-free powdered hard alloys and introduction in series production at the Ilmarine Plant.

L. V. Gavrilova, Kh. A. Kunberg, L. A. Laysaar, A. N. Lind (deceased), V. N. Lind, K. I. Ol, Kh. K. Palla, O. Ya. Siymon, A. A. Turp, K. A. Fuks--for an efficient system of the production of meat of broilers in the Estonian SSR.

L. M.-R. Laasimer (manager of the collective), K. Yu. Eykhvald (deceased), M. K. Kask, V. V. Kuusk, G. K. Muuga, Kh.-E. A. Rebassoo, S. Ya. Talts, A. Ya. Vaga (deceased), L. T. Vilyasoo, A. Ya. Yuksip--for the monograph "Flora Estonskoy SSR" [Flora of the Estonian SSR] (in two volumes), Tallinn, "Estonskoye gosudarstvennoye izdatelstvo", 1959-1962; "Valgus", 1966-1984.

Kh. A. Idarand, N. A. Edesi, Yu. A. Kumar, E. O. Lokk, A. P. Luurmees, A. E. Meyyer, I. Ya. Myuyrsepp, S. A.-D. Pallon, O. R. Saveli, N.-Y. M. Tilk, E. Ya. Umbleya, E.-A. K. Valdman--for the development and introduction of an advanced system of breeding work with cattle in the Estonian SSR.

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GENERAL

NEED TO DIRECT MOLDAVIAN ACADEMIC RESEARCH TOWARD ECONOMIC NEEDS

Kishinev SOVETSKAYA MOLDAVIYA in Russian 11 Jul 85 p 2

[Article by D. Gitsu, academician secretary of the Physical, Technical and Mathematical Sciences Department of the Moldavian SSR Academy of Sciences: "Sectorial Requirements Are the Guideline"]

[Text] Two events of this year are destined to become the most important landmarks on the way to further developing Soviet science and strengthening its alliance with practice. These are the April Plenum of the Central Committee of our party and the conference in the CPSU Central Committee on questions of accelerating scientific and technical progress.

Among the many questions considered at the plenum and conference an important place was occupied by the problems of academic science and of its role in speeding up the development of our society. It is necessary to attach priority importance, it was stressed at the conference, to the development of basic science. Precisely it acts as the generator of ideas and provides an outlet to a new level of efficiency.

And further, a demand was clearly formulated: to direct academic institutes toward the expansion of technically oriented research and to increase their role and responsibility for developing the theoretical bases for new equipment and new technology. Hence follows the specific task on reforming the planning of academic science, its integration with sectorial scientific research institutes and the strengthening of its ties with practice, while keeping in mind our main reference point--the needs of production.

It must be said that the scientific institutions of the Physical, Technical and Mathematical Sciences Department of the Moldavian SSR Academy of Sciences in their work have already tried not to lose sight of the needs of experienced workers. Moreover, when working on basic problems, they strove to see the future and to get into specific production processes. Here are some examples. Within the framework of solid-state electronics, which, as is known, is the element base of computer technology and means of automation, radio engineering and television systems, advanced technologies for obtaining new semiconductor

materials, parametric microtransformers and optical electronic elements were developed on the basis of basic research. Today many of these materials and instruments are already being used widely in practice.

The thorough study of the process of electroflotation and of perceiving its laws made it possible to give the enterprises of the agroindustrial complex a fundamentally new technology for clarifying apple juice and refined vegetable oils. Many such facts can be cited. However, these are nonetheless incomplete solutions.

Today the problem is being posed differently: the orientation of academic science toward the needs of the economy requires systematicness. Its basis is a fundamentally new approach to the planning of scientific research, the improvement of the mutual information of scientists and experienced workers and the uniting of the efforts of academic, sectorial and plant science. This is precisely what we have in mind when reorganizing the activity of the scientific institutions of the Physical, Technical and Mathematical Sciences Department and when formulating research plans for the 12th Five-Year Plan. Priority is being given to such basic research which will support real applied developments which are intended for practical sectorial application. Among them are research in solid-state electronics, of the theoretical research of which new advanced materials and technologies, which are used in a wide range of electronic devices, and research in the field of information science, which is aimed at the development of flexible automated systems, robotized technologies and systems of computer-aided designing and the control of production processes, will be the result. We will continue the development of the electric spark and electrochemical alloying of materials with the aim of developing automated plants, which are controlled by microprocessor devices, and a number of other basic directions.

Along with reorganizing the planning of the work of scientific institutions it is also necessary to solve many other problems. Experience shows that without the development of a powerful experimental production base, which is equipped with the latest equipment, it is impossible to establish effective ties between science and production and to make the achievements of science available in a short time to practice. Today the work experience of the engineering centers established in the Ukraine and Belorussia under large academic institutions is well known. Owing to them the time needed for introducing new instruments, devices and equipment has been reduced to 2 years. In our view, this is very valuable experience. The need has arisen, in particular, for the establishment of a republic scientific production center for automated systems and robotics, the organization of an interdepartmental center for electric spark alloying and a pilot experimental enterprise of new equipment in power engineering. Functioning within the system of the Academy of Sciences, these subdivisions would be able to implement a unified scientific and technical policy, to conduct goal-oriented research and applied development, to bring them up to the level of prototypes and to produce small series of instruments and equipment.

The interrelations at the present stage of basic, sectorial and plant science should be spoken about specially. It is difficult to recognize as normal the situation when academic researchers sometimes engage in minor technical

development, while a plant laboratory is attempting to solve a major scientific problem. At a round-table meeting in the editorial office of SOVETSKAYA MOLDAVIYA for the discussion of the problems of the functioning of the plant sector of science these questions were posed rather sharply. The scientists of the Academy of Sciences are ready to help plant researchers in all possible ways and will do this. But it is important to organize cooperation so as to avoid duplication and the lack of coordination and so that everyone would do his job. For this it is necessary to increase decisively the role of the republic council for the coordination of intersectoral problems and to make wider use of improved economic planning levers of management.

The scientific and technical revolution reveals its potentials only when it penetrates all pores of the economy and not individual, albeit even most advanced, sectors. Therefore, the promotion and introduction of the latest achievements of science and technology should encompass all aspects of man's social activity. The constant training and advanced training of personnel in all the links of the national economy and the mastering of new technical and technological means and processes are an indispensable condition of the increase of the efficiency of the entire national economy. The role of academic and sectorial institutions and higher educational institutions in the development of a broad, flexible system of the improvement of the skills of personnel is increasing. It would not be an exaggeration to assert that at present the need for personnel with scientific and technical training at the level of candidates of sciences is becoming just as pressing a problem as the training of engineer-production leaders was in the 1950's. In this connection, apparently, the training of highly skilled personnel through graduate studies and the system of the seeking of a degree first of all for the most important scientific directions, as well as for the leading sectors of the national economy should be expanded. Here, too, cooperation is necessary, because the modern engineer or scientist cannot be trained without the corresponding material and technical supply of the educational process.

In connection with the problem of the rapid introduction of scientific developments and the training of highly skilled personnel the question of establishing educational scientific production centers with their own experimental base is acquiring particular importance. It seems that we have the necessary conditions and possibilities for this.

An impressive scientific and technical potential has been created in the Moldavian SSR today. The problem is to find the optimum means of its best utilization and to put to use all the reserves of the acceleration of scientific and technical progress.

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GENERAL

RESPONSES TO PRAVDA QUESTIONNAIRE ON SCIENTIFIC, TECHNICAL PROGRESS

Party Workers

Moscow PRAVDA in Russian 8 Jul 85 p 2

[Article: "Thus Order the Times"]

[Text] How to solve more successfully the urgent problems of the acceleration of scientific and technical progress--the questionnaire of PRAVDA, which the editorial office addressed to party workers, the executives of ministries and departments, enterprises and associations, scientists, workers and kolkhoz farmers, was devoted to this most important theme. Today the first selection of materials is published--party workers answer the following questions of PRAVDA:

1. What that is new has been introduced in party work since the conference of the CPSU Central Committee on the questions of the acceleration of scientific and technical progress?
2. How is one to free oneself from ostentation, speechifying and paper work and to create a sound barrier against conservatism, departmentalism and regionalism? What is being done at your place in this respect?
3. To activate the human factor, to reform the psychology of people in conformity with the requirements of the present--such is the task of tasks. How is this being done?

With Reliance on Initiative

First Secretary of the Belorussian CP Central Committee N. Slyunkov

1. The main thing, to which we are directing the attention of the party organizations of the republic, is to actively develop already today, without waiting for any additional decisions and instructions, the accomplishment of the set tasks. In each collective to seek reserves of the acceleration of



scientific and technical progress. To seek and as quickly as possible put to use!

Such today is the basic content of the work of many of our party organizations, which are skillfully relying on the initiative of people. For example, the collective of the Vitebsk Monolit Association, in discussing the prospects of retooling, decided to develop capacities for the production of equipment and means of mechanization for its own needs. This will make it possible during the 12th Five-Year Plan to increase the annual updating of the active portion of the capital to 12 percent, that is, several fold more than now. The workers and engineers of the Minsk Bearing Plant are expanding the introduction of new, advanced techniques of metalworking. By means of this already now up to 3,000 tons of metal are being saved a year, while in the immediate future even more will be saved. In short, wherever they are seeking, there they are finding.

The party committees of the republic are now carefully generalizing the experience of the work of our first intersectorial scientific production associations. They are directly subordinate to the Belorussian SSR Council of Ministers and are accomplishing an important task--they are developing at the present level of technology items and equipment for enterprises of the region regardless of their sectorial affiliation. Thus, the Scientific Production Association of Powder Metallurgy produces items for 27 enterprises of 10 ministries and departments. Thousands of tons of rolled metal products are being saved, many workers are being released. The Planar Scientific Production Association has increased the productivity of the equipment being produced by five- to sixfold and its precision by two- to threefold. The results are encouraging.

And there is another innovation: we are setting up councils for the promotion of scientific and technical progress attached to the Belorussian CP Central Committee, oblast, city and rayon party committees. The main goal is to coordinate and concentrate the efforts of party, soviet and economic organs, scientists and specialists, regardless of their department subordination, in the interests of the most rapid solution of fundamental national economic problems.

2. I have already answered this question in part. For everything new, that is being introduced in our party work, is called upon to promote the improvement of the style of management. But there are still many problems here.

Take if only the notorious paper work. What gives rise to it? As a rule, the irresponsibility of several managers. Here they hide behind a document, play it safe and hinder the matter.

We are posing the question as follows: if there are serious suggestions, original opinions, please, come to the party committee, we will consult and help. But we will not allow you to bombard us with a paper snowfall. The party committee is not a screen for covering up the incompetence or timidity of a manager. We strictly reminded one, a second one of their official position, duty and responsibility to the state, while a third one began to

decide himself. Last year the flow of written appeals on purely economic questions to the republic Communist Party Central Committee decreased by 2,395 documents. This trend is now also continuing. Decisions are being made more boldly locally.

We have bluntly agreed to the decrease of regulated measures, meetings, conferences and rallies, that is, everything that is frequently work only in form, but not in content and does not stem from the interests of the matter.

Departmental barriers, it must be admitted, give way with difficulty to siege. Several forms of their overcoming were spoken about above. I believe that the Intensification Comprehensive Scientific and Technical Program, which we formulated and are including as a component in the 12th Five-Year Plan, will also help us.

We have introduced into regular practice reports of the party committees of ministries and departments. Party executives of the Ministry of Industrial Construction, the Ministry of the Timber and Wood Processing Industry, the Ministry of Land Reclamation and Water Resources, the Ministry of the Construction Materials Industry and the Ministry of the Fruit and Vegetable Industry have reported at the meetings of the Bureau of the Central Committee. Through the work of the party committees we are influencing the state of affairs in administrations and departments and are striving to create an atmosphere of mutual demandingness and great responsibility.

3. All of us must learn to work in the new way, in many ways to reform our psychology. And the best school here is advanced, innovative know-how.

A few days ago in the Bureau of the Central Committee we discussed the work of the party committee and the administration of the Orsha Krasnyy borets Machine Tool Building Plant on the increase of production efficiency. The collective is working in an interesting, creative way. The entire set of production and social problems is being skillfully solved. The plant is cooperating fruitfully with 30 academic and sectorial institutes and organizations. Annually 590 tons of rolled ferrous metal products are being saved. But the main thing is that a high technical level of the machine tools, which ensures their competitive ability, has been achieved. They are being exported to 86 countries of the world, including such developed countries as England, the FRG, Canada, Japan and Italy.

Here is an example for you of the current approach to the matter. We decided to disseminate the experience of the Orsha workers throughout the sector and to show clearly to others what it is possible to achieve by the acceleration of scientific and technical progress. We also supported the Minsk workers, who last year adopted the obligation to obtain the entire increase of production without an increase of the consumption of rolled ferrous metal products, thermal energy and electric power.

However, I will state frankly: for the present far from everyone is reforming. It is necessary to explain, to persuade and to punish. But it is easy to free oneself from some people. First of all from conservatives, incorrigible adherents to the formal bureaucratic methods of management. In

recent times, in particular, for these reasons Yu. Sheyko, chief of the Railroad Car Repair Plant imeni Myasnikov, V. Ivinskiy, general director of the Stroy mash Production Association, and several others were removed from the positions they held.

Time today is stern. It makes it incumbent to increase significantly the accountability of each worker. We will also be guided by this.

Your Mission, Communist

First Secretary of the Gorkiy Oblast Committee of the CPSU Yu. Khristoradnov

1. In accordance with the recommendation of the oblast committee of the CPSU the city and rayon party committees are taking steps for the improvement of the structure of party organizations in order to increase their influence on the course of scientific and technical progress. In particular, party groups are being set up in the sections which are directly engaged in the introduction of new equipment and advanced technologies. While it has been decided to send party organizers to the difficult and responsible sections in which the collectives are small.

A large program of the retooling of production and the updating of the output being produced has been outlined at the Gorkiy Motor Works. In this connection a party reinforcement will also be sent here: hundreds of communists--experienced engineers, designers, production organizers and party workers--will come.

Much has to be done so that the management of the acceleration of scientific and technical progress would be specific and effective. Plans of the work of party committees are envisaged for this purpose. We are taking steps which are aimed at the increase of the responsibility of personnel. The practice of individual interviews and reports of communist managers has been expanded. Field editorial offices of the oblast, city and rayon newspapers, television and radio and worker correspondent posts have begun to work at the most important projects of the national economy.

One of the key questions is the increase of the efficiency of all forms of party control. And first of all the commissions for the control of the economic activity of the administration. This is a considerable force. In machine building alone, and it makes up nearly half of the industrial potential of the oblast, more than 2,500 workers and specialists have been enlisted in the work of such commissions. The questions of the renovation of production and the introduction of new equipment have become today their main concern.

Many years of experience of the work of party organizations under the conditions of production and scientific production associations have been gained in the oblast. Here there are, of course, also their own unsolved problems, but much has already been verified by practice and has justified itself and, hence, will help to accelerate scientific and technical progress.

2. In recent times there has been noticeably more efficiency in the style and methods of the work of the party committees of the oblast. The oblast committee started with itself. With the adoption of a decree which specified the basic directions of the work of the staff of the oblast committee. At the same time we also brought our regulations in line with the new requirements. We began to meet less, the number of questions discussed at the meetings of the buro was reduced. Moreover, we are selecting them more carefully and are striving to consolidate them as far as possible.

Previously it happened as follows: if some department is preparing a question, the others as if have nothing to do with it. Something like "departmentalism turned up within the oblast committee itself. We did away with such a procedure. Now the workers of a number of other departments are taking part in the preparation of a question, in addition to the department which is preparing it. This is ensuring a comprehensive approach, and it is always more thorough and exhaustive. The efficiency of the verification of implementation is also increasing.

There are fewer documents. In the General Department they calculated that as compared with last year the number of "outgoing" documents, which are sent from the oblast committee, has decreased by 40 percent. The number of various conferences and meetings is being decreased everywhere. They have begun to hold them, as a rule, on Saturdays and nonworking days. The summoning of managers and other workers of enterprises to party and soviet organs has been regulated.

And all the same it is impossible to say that we have completely gotten rid of paper work and ostentation. Unfortunately, lovers of starting up correspondence on trifling matters and people fond of reporting and coming forth with "initiatives," which when it comes to the test do not contain anything except a high-sounding name, still remain. It is necessary to do away with all this more resolutely.

The combination of the efforts of enterprises of different departments is helping the matter. These are both the construction of a number of projects and the output of new equipment, which is extremely important for the development of the economy of the oblast. We have a good example of such cooperation in Priokskiy Rayon of the city of Gorkiy. The enterprises located here are subordinate to several ministries. A council of chief engineers, which is making it possible not only to share advanced know-how, but also to seek jointly, without a departmental approach means of solving the scientific and technical problems which arise at enterprises, was set up on the initiative of the rayon party committee.

3. If we speak about the human factor, in our best collectives it is operating actively. But this means that here they will not push an efficiency expert into the background, will not stifle a useful matter, but will give wide scope to the innovator, initiative and a bold search. Such an atmosphere has formed, for example, at the Zavod imeni Ulyanov Production Association. Not by chance has this enterprise achieved leading positions in the acceleration of scientific and technical progress--it was one of the first in

the oblast to begin the introduction of flexible automated manufacturing systems.

The psychological barrier in the very way of thinking still often hinders the introduction and assimilation of what is new. Sometimes ossified attachment to the old, conservatism in consciousness and, hence, inertness in deeds create such an obstacle. But often people simply poorly imagine one technology or another, judge its potentials by hearsay and in the end are timid before it. Consequently, it is necessary to help them to overcome such a barrier and to teach them. We also decided to begin with this. A special set of lectures and practical studies for managers in the use of computers in the national economy was developed by the departments of the oblast committee jointly with Gorkiy University. But this today is the front line of scientific and technical progress.

### Improving the Style

First Secretary of the Tomsk Oblast Committee of the CPSU A. Melnikov

1. Definite experience in the management of scientific and technical progress has already been gained in the oblast. The impact from the implementation of comprehensive goal programs, which the coordinating council attached to the oblast party committee is formulating and implementing, is very appreciable. And nevertheless a number of sectors are still being developed inadequately, their growth rate cannot satisfy us.

At present we are posing the task: to ensure the comprehensive introduction of everything advanced that scientists have developed. Only in this way, it seems, will we be able to achieve the high growth rate which the party expects of us.

This work is being performed by the oblast committee of the CPSU, the council for coordination and specially established groups of introduction, of which workers of the corresponding departments of the oblast committee, managers of enterprises and organizations and scientists are members. On the basis of our leading enterprises--the Sibelektromotor and Kontur associations--we held seminar conferences on the economic effectiveness of retooling and the certification of workplaces. We have analyzed once again all the links of the chain, which unite science, technology and production.

The number of comprehensive goal programs has also been increased: whereas previously there were three of them, now there are already five, and another three are being formulated.

2. I have already had occasion to tell in PRAVDA about the combating of the abundance of all kinds of meetings and official documents. Now I will speak in more detail about departmentalism.

Here in Tomsk there are many related enterprises: seven which are subordinate to the Ministry of the Electrical Equipment Industry, six--to the Ministry of the Timber, Pulp and Paper and Wood Processing Industry and so on. On the basis of their example we are observing, so to speak, "departmentalism

squared": when even the plants, which belong to a single ministry (but to different main administrations and all-union industrial associations), cannot set up among themselves the most elementary cooperation. It would seem that it is advantageous to all that they would combine their efforts in the production of accessories, nonstandard equipment, castings and packaging and in the construction and operation of housing, polyclinics and subsidiary farms. But no such luck: the all-union industrial associations are vigilantly guarding their boundaries and are not allowing any "outsiders" to intrude upon them. Or there is the following example. Tomsk railroad ties travel for impregnation all the way to the Northern Caucasus, while in our oblast the tie-impregnating plant is standing idle: it belongs to another department!

By the efforts of the coordinating council attached to the oblast committee and all our party organs it was possible to a significant extent to raze such barriers. Thus, we were able to unite the computer facilities of the oblast statistical administration, the Tomsk higher educational institutions and enterprises and on this basis set up a collective-use computer center. The impact from such integration is unquestionable.

And all the same the problem, as we see, remains. Our scientists joke: in conformity with the well-known law of the conservation of matter and energy, in order to give enterprises independence, it is necessary to take it from someone. This question has come to a head and, in my conviction, it is necessary to solve it by the elimination of unnecessary management units. Obviously, it is also time to revise the structure of the sectors.

Recurrences of departmentalism are also being observed in the party staff. Sometimes, before settling some question, it is necessary to exert efforts in order to achieve in one's own department not a departmental, but an exclusively party understanding of the question. The excessive disunity of the departments of the oblast committee is also interfering. I believe that it makes sense to replace several small departments with one consolidated department. At present such proposals are being formulated by us.

3. At the beginning of this year an extremely difficult situation in petroleum production formed here: the rate decreased, the plan "burned." At that time the secretaries and many other workers of the oblast party committee went to the city of Strezhevoy in order to investigate on the spot. The party organization took a number of urgent steps, and in the end the situation was straightened out. They were able to convince people and to force them to believe in their own powers.

But the human factor is not only "you must!" and not only "give!". First of all this is concern for people. Concern not in words, but in deed. In striving to create the maximum conveniences for them, we are developing the work shift system of the development of northern deposits and are constantly improving the conditions in the base city, at the work shift settlements and directly at the workplaces. And it is offensive in these matters to come up against someone's lack of understanding and even resistance. The State Planning Committee, the State Committee for Labor and Social Problems, the

All-Union Central Council of Trade Unions and the ministries must more actively pave a wide road to this advanced organization of production.

It is quite obvious: first of all we should reform the psychology of managers and aim them at a very turbulent life, at a creative approach and at the constant search for what is new and advanced. We are striving to educate our management personnel in precisely this way. Along with independent searching we are also teaching them to actively adopt the advanced know-how of our neighbors. It has already become a part of our practice: to regularly bring together a group of party and soviet workers and managers of enterprises and farms and on days off to send them to the addresses of advanced know-how. We have already seen and adopted much that is good from our comrades in the Altay and Kuzbass, in Krasnoyarsk Kray and Tyumen Oblast.

To constantly study what is new and advanced and to actively confirm it--this should become the law of all our life.

Union Ministers

Moscow PRAVDA in Russian 9 Jul 85 p 2

[Article: "The Points of Support"]

[Text] Today a number of executives of the key sectors of industry share their thoughts on how to accomplish the tasks of the acceleration of scientific and technical progress, which were posed by the party.

In the published selection of materials the USSR ministers respond in brief to the questions of the PRAVDA questionnaire:

1. What are you doing for the purpose of accelerating scientific and technical progress in the sector?
2. How are production efficiency and work quality to be increased?
3. What is being done in the sector on the technical renovation of the production?
4. How do you conceive of the system of the management of the sector?

The Facets of Efficiency

USSR Minister of the Electronics Industry A. Shokin

1. In order to speed up the process of developing and assimilating new items, the ministry has included 80 percent of the scientific research institutes and design bureaus in scientific production associations. Life has confirmed that scientific production associations are a more effective form of the contact of

science with production as compared with production associations. The "research-production" cycle is reduced to two-thirds. And all the other indicators speak in favor of scientific production associations: at them the growth rate of labor productivity is 3-4 percent higher, the level of expenditures per ruble of commodity production is significantly lower. The output of new products, which satisfy the most exacting requirements, increases by twofold.

I would like to note that in the sector we are striving to ensure the optimum ratio of science and pilot production. Institutes of the Academy of Sciences and higher educational institutions are participating extensively in scientific development. In the sector there is its own scientific and production base for the development of special technological equipment, which has helped to ensure a high growth rate of the electronics industry. During the 11th Five-Year Plan 1.5-fold more such equipment will be produced than during the last five-year plan. While for the 12th Five-Year Plan it is planned by the ministry to increase its production by twofold. Particular attention in case of the development of new equipment will be devoted to flexible automated lines, which make it possible to carry out the quick reorganization of production for the required range of items.

2. The problem of increasing efficiency has a large number of facets. The yield of the sector will be higher, if we concentrate resources on the decisive sections. Take such a problem as electronic materials. We have been forced to produce many of them in our sector, diverting for this considerable scientific personnel and production capacities. We believe that it is time to set up special plants of electronic materials in the chemical industry, in ferrous and nonferrous metallurgy, where it is also time to develop the scientific research base. The need has arisen to elaborate a set of basic standards, which specify the demands on the quality, technology and acceptance of materials for electronic engineering.

This problem is closely connected with the increase of the quality of our products. We are striving to make them more reliable and durable. To a certain extent this is succeeding. From year to year the number of complaints has been decreasing.

Now we are on the threshold of a new leap in electronics. This is connected with the further improvement of integrated circuits and the sharp increase of their speed due to the decrease of the linear dimensions. Man will be able to design submicron ultra high-speed and extra-large integrated circuits, only after having developed powerful computer-aided design systems. We are developing these systems.

Product quality is connected with retooling, a fundamentally new approach to designing and the introduction of the latest achievements of science. In the electronics industry this is especially important.

3. The technical reequipment of the sector during the 12th Five-Year Plan will take place mainly by the renovation and retooling of operating enterprises. More than 75 percent of the capital investments being allocated to the sector .pa



will be spent for these purposes. Such an approach to the distribution of assets has become the rule here. Walls, as is known, do not yield a profit.

Judge for yourself. Whereas during the 10th Five-Year Plan we needed 43 people for an increase of output by 1 million rubles and during the current five-year plan we needed 13 people, during the 12th Five-Year Plan we are planning 5 people.

4. The fact that it is necessary to introduce long-term standards with respect to the basic types of activity of sectors, has already been spoken about more than once. But there are still no such standards. And this has enabled ministries to have a free hand in the introduction of new equipment and in the more efficient use of reserves. At present the ministries are bound by a large number of indicators of the annual plan, but standardized planning within the five-year plan has not been introduced even by the sectors which have joined in the large-scale experiment. If numerous indicators are established for the ministry, it, of course, sends these indicators down and restricts the initiative of enterprises.

At present two systems of planning, which are not interconnected, are simultaneously in effect: one of them, in industry, is aimed at the planning and stimulation of the increase of the production volumes in the same rubles, the other, in science, is aimed at the acceleration of technical progress. Of course, it would be advisable to reform planning so as to link the plans of production and technical development. For science in many ways determines production efficiency.

They are debating very much about the indicators of planning. First one indicator, then another is rejected. We had personal experience of the gross output, the sales volume and the standard net output. Formally, except for one of them, they are estimated indicators, but in practice are of the nature of approved indicators. It is insufficient to plan only the products list, it should also have a value estimate. But the gross output should be not the starting point of planning, but an accounting function. The need for items of the specific products list should be the starting point. Then there will not be what is called the "air" of the paper gross output for the sake of the increase of the growth rate. There will be no output of unnecessary products, the need for forced cooperation, in case of which the output in physical terms does not increase, while the gross output accumulates due to the increase of prices or the intrafirm turnover, will disappear. All these questions have for a long time required settlement.

With the Same Number of Workplaces

USSR Minister of Instrument Making, Automation Equipment and Control Systems  
M. Shkabardnya

1. The scientific and technical level of products is dictated by the increasing needs of the national economy for the most advanced instruments, means of automation, computer technology and program-controlled equipment. Today this equipment can be considered new only if it enables the user to considerably--not by percents of what has been achieved, but by several fold--

increase labor productivity, decrease the product cost and increase the precision of control and regulation.

At present our developers are concentrating efforts on fundamentally new approaches and technologies and are striving to use more extensively modern microprocessor and laser equipment and optoelectronics. During the 12th Five-Year Plan it has been decided by the ministry to increase the volumes of the development and use of these products by three- to fourfold. This, in turn, will make it possible to reduce to one-half to two-thirds the materials-output ratio, the labor intensiveness and energy consumption at the works which produce these items.

Additional steps are being taken for the rapid supply of the subdivisions of the sector with the necessary test equipment and automated workplaces (ARM's) of the designer, the process engineer and the programmer. The goal is being set: during the 12th Five-Year Plan to cover by automated workplaces more than half of the design operations, while to change over technological preparation and programming entirely to automated methods.

2. The entire increase of the production volumes during the 11th Five-Year Plan has been achieved without an increase of the consumption of ferrous and nonferrous metals and other basic materials. We are also outlining this policy for the new five-year plan, although the production volumes will increase more rapidly. We have been working with an invariable number of personnel the entire 11th Five-Year Plan, while increasing labor productivity annually on the average by 7 percent. During the new five-year plan we will work, as before, without increasing the number of workplaces.

How are we achieving a saving of resources and labor? We are miniaturizing and unifying modules, assemblies and parts. We are using low-waste technologies and new advanced techniques of the shaping and machining of parts.

Now about quality. In conformity with the decisions of the conference in the CPSU Central Committee we are studying an additional set of measures, which together with the sectorial goal program "Quality" will increase the technical level of products, first of all the reliability. The goal for the five-year plan is such: with respect to all the basic groups of instrumentation equipment to reach the technical level which the users of our products need. All the instruments and devices, which are being newly assimilated, in their characteristics will conform to the highest quality category.

Various steps have been outlined for this. We will strive for the rigorous observance of technological discipline and will use even more extensively the advanced organization of production. We are providing the enterprises of the sector with special equipment for objective automatic input, intermediate and output control. Testing grounds are being set up at many plants.

3. Renovation and retooling have become for us the basic direction of development. During the current five-year plan 70 percent of the capital investments have been allocated for these purposes.

At the conference in the CPSU Central Committee it was noted that not any updating of production, but such updating, which is accompanied by the introduction of the most advanced equipment and yields the greatest economic and social impact, is needed. We are firmly adhering to this policy. Owing to robotization during 1982-1986 we are freeing about 40,000 people from monotonous, harmful and difficult jobs. As a whole during the 12th Five-Year Plan the labor of about 140,000 workers will be saved, the proportion of those engaged in manual labor will be reduced to 24 percent. Robots, flexible complexes and rotary and rotary conveyor lines are being introduced at all our enterprises.

4. Suggestions on the substantial consolidation of production and scientific production associations and the establishment of new ones on the basis of the unification of scientific research institutes and design bureaus with enterprises have been prepared. Only the main institutes, which are working on major sectorial problems, will be retained as independent ones. This will reduced to nearly a third the number of independent units of management. According to preliminary estimates, such integration of science with production will enable us to shorten the time of the development and assimilation of new complex items by approximately a year. For the elimination of unnecessary units of management we intend to subordinate associations and enterprises directly to the ministry.

I would like to emphasize (this was also spoken about at the conference in the CPSU Central Committee) that such reorganization is possible only in case of the overall improvement of the organizational structure--from the highest to the lowest levels, moreover, it is necessary to begin with the upper echelons. Only under these conditions can the economic rights of sectorial ministries, associations and enterprises really be broadened. First of all it is necessary to decrease substantially the number of plan indicators, for example, on the products list, having transferred a portion of the functions of planning organs to the ministry. It has long been time to abolish the annual assignments on the decrease of management personnel. The determination of their optimum number, the number of subdivisions and the ratio between senior and junior specialists should be entrusted to the managers of associations and enterprises, having granted them the right to settle these questions independently within the limits of the wage fund.

For High Quality

USSR Minister of the Automotive Industry V. Polyakov

1. For our sector scientific and technical progress is the output of highly efficient and economical motor vehicles. This is our chief task. The 11th Five-Year Plan for the sector became, it can be said, a landmark five-year plan. All the plants developed and tested new models of vehicles in order during the 12th Five-Year Plan to begin their mass production.

At the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress the need to expedite the changeover of the fleet to diesel engines was discussed. The use of diesel engines makes it possible to decrease fuel consumption by 30-35 percent as

compared with gasoline engines. Moreover, their life is increased by 1.5- to 2-fold. In the next few years diesel trucks and trailer trucks should assume a significant portion of the freight turnover of motor transport of the country.

At the Gorkiy Motor Vehicle Works--the GAZ Production Association--the development of the design of a new family of trucks with diesel engines is being completed. The Gorkiy workers have to engage in the production of agricultural trailer dump trucks.

It will also be necessary to do much at the Moscow ZIL Production Association. Here they are developing capacities for the mass production of tractor and trailer truck trains with a carrying capacity of 11-14 tons. A powerful liquid-cooled diesel engine will be used in the base model.

The collectives of other enterprises of the sector are also working on the assimilation of new vehicles. Not everything is going smoothly. There are also problems. Thus, the production of new equipment at the Minsk and Kremenchug motor vehicle works for the present is being assimilated slowly. The suppliers--the Yaroslavl motor builders--are letting them down. Their diesel engines need improvement. It is necessary to develop not only powerful, but also highly economical diesel engines. This is a command of the times. It must not be forgotten that due to the lag in the changeover of the fleet to diesel engines much gasoline is being excessively consumed annually.

2. The quality of motor vehicles is not only the high skills of workers, engineers and designers, but also the latest technology and modern equipment. Much is being done in this direction. At a number of enterprises they are using new machine tools and lines, flexible manufacturing systems. Automatic body welding complexes with the use of robots are playing a larger and larger role in the mass production of vehicles. In small-series production we are using NC machine tools and automatic lines, we are using electronics more extensively.

We will make ZIL and GAZ diesel motor vehicles on the basis of the use of the latest equipment. This will make it possible to free many workers who are engaged in the performance of difficult and monotonous operations. Moreover, it will be possible to update the produced models of vehicles more rapidly than is now being done.

In the machining process we are also beginning a qualitative reorientation. We are producing automated machining complexes (MAK's) for the replacement of rigid automatic lines. They are several automatic machining centers which are united into a single whole by means of the parts-handling system. The complexes have computer-controlled receiving-issuing and loading devices. Robotized complexes will also beginning to be used in the assembly of new diesel engines, which will make it possible to achieve a new level of quality. Of course, much work still lies ahead.

3. Whereas during the 9th and 10th Five-Year Plans the automotive sector was developed, it can be said, primarily by the extensive means, in which the construction of new plants was the main direction, the construction of large

enterprises was not planned for the 11th and coming five-year plan. We are channeling all resources and all forces into the retooling and renovation of operating works.

Just one example is the Gorkiy Motor Vehicle Works. The question of its retooling was considered recently at a meeting of the Politburo of the CPSU Central Committee. At the Gorkiy Motor Works this is now not the first renovation. One of our oldest works will change its appearance. About 10,000 workplaces will be freed just by the mechanization and automation of the most obsolete processes.

A plan of the retooling of the Uralsk Motor Vehicle Works and other enterprises of the sector has also been prepared. Renovation will affect comparatively young enterprises. During the next five-year plan the Kama Complex of plants for the production of heavy trucks and diesel engines will be brought up to the rated capacity. Here promising designs of a new family of two- and three-axle trucks, which are intended for a 10-ton axle load, are being prepared in good time. These are vehicles for operation within truck trains of a large carrying capacity.

In Kutaisi the collective of auto workers are increasing the output of transportation and technological trailer dump trucks for the countryside. It is a good, promising vehicle, but much work still has to be done on it.

4. A number of measures, which are aimed at simplifying the system of management, have been implemented in the sector. We disposed of the unnecessary units and set up production associations, having transferred to them a large number of enterprises. And now every association deals independently with designing, the operational development of the design, new technological processes, the organization of the output itself of motor vehicles, the production of spare parts and in a number of cases the firm supply of spare parts. But precisely here not everything is yet satisfactory, especially with passenger cars. There are not enough of many spare parts, they are, as before, scarce, which is evoking just reproaches of buyers. We have studied this problem and are taking steps on its basic solution.

The Ministry of the Automotive Industry for the most part is operating under the conditions of a two-level system of management. The production associations are subordinate directly to the ministry. They now produce more than 60 percent of the products of the entire sector. Life has shown that such a system is efficient. We will develop and improve it in the same way as the firm maintenance of motor vehicles, which at one time the Volga and Kama motor works commenced.

Workers, Kolkhoz Farmers

Moscow PRAVDA in Russian 10 Jul 85 p 2

[Article: "Not a Day Without Searching"]

[Text] The party is calling upon not only specialists and scientists, workers of the sphere of management and planning,

but also millions of rank and file workers to solve the urgent problems of the acceleration of scientific and technical progress. Much depends on their activeness, skill and creativity.

Today we are publishing the responses of workers and kolkhoz farmers to the questions of the PRAVDA questionnaire:

1. How do you see your personal role in the acceleration of scientific and technical progress?
2. How is one to ensure great discipline and order at the workplace?
3. What would you want from managers for the increase of labor productivity?

#### Stimuli of Growth

Yu. Metelkin, leader of a brigade of milling machine operators of the Leningrad Optical Mechanical Association

1. When the collective of the enterprise begins to assimilate the production of a new medical measuring instrument, a microscope, they usually commission our brigade to produce the metal parts of the test run. Each time during such work 10 or else more efficiency proposals originate: we devise accessories which make it possible to increase labor productivity when producing scientific and technical innovations.

Then the items go into series production. We turn over the results of our efforts to other brigades which attend NC machine tools and units like the "machining center." The shop is furnished well with this advanced equipment. The first line of the flexible automated manufacturing system is being put into operation in our section.

2. It is necessary, in my opinion, to hold strictly accountable not only the violators of discipline themselves, but also those who indulge them. Who specifically should call to account? First of all the foreman. He is closest of all from the administration to the worker. But this position has now become lacking in prestige.

Moreover, it seems, everyone agrees that the foreman is the key figure at the works. However, in practice the attitude toward him is changing slowly. In my firm conviction, it is necessary to create the conditions so that the foreman would earn at the level of a skilled worker. For the present he receives much less, and this somehow disparages him.

The problem also has another aspect. The very word "foreman" has begun to lose its direct meaning. Previously (and I have worked in the shop since 1950) people with much practical experience held these positions. They knew the job perfectly and could quickly detect a mistake and teach the worker how to correct it. And they enjoyed unqualified authority. Now young specialists

with a diploma of a tekhnikum or higher educational institution are becoming foremen. They have enough theoretical knowledge, but they slowly feel at home at the works. I believe that the systems of the training of managers of the lowest levels should be changed.

3. The main thing is a clearly thought out, scientifically and economically sound system of all work. For the present there are many shortcomings here. There are elements of leveling. Unjustified norm setting and planning are checking the increase of labor productivity. Let us face it, everyone knows: if a worker does more than usual, they will close for him a portion of the orders the next month and all the same will "arrive at" the wage within the limits of the average wage, in order to keep within the shop wage fund. Such a system is only in form a component of the state order. In essence it disenchanting diligent and capable people.

There are instances when the brigade for a number of years produces the same parts. Often without any improvements which facilitate labor and increase its productivity. Nevertheless the plant services annually decrease the indicator of the labor intensiveness. As a result they cut it to the point that the workers lose all interest in their own labor and its results. Here is what lies behind the concept "unprofitable work." It exists, and one must not shut one's eyes to this phenomenon. It is necessary to combat it.

I would want to wish the managers to develop further the brigade forms of the organization of labor. Not in quantity--here it is necessary to act more circumspectly and not to get carried away by percentages to the detriment of work. I am talking about quality, about the essence. At present the brigade does not yet have the rights which enable it to settle itself questions of labor and the distribution of the wage. The administration is taking these rights away, while the ministry, in turn, is taking them away from it. But in order to make people accountable, it is necessary to have faith in them.

#### Play a New Tune

##### I. Morar, brigade leader of the Kishinev Tractor Plant

1. Since vocational school I have already worked 30 years at the tractor plant. I can say: experienced workers treat with profound personal interest all the affairs of their enterprise and for the sake of the common good are always ready to help unselfishly in case of difficulties. In my day I myself transferred from a leading to a lagging section, where both the conditions were worse and it was necessary to exert greater physical effort, while the wage was significantly less. I wanted to change the situation. My new brigade was able to achieve even more. Now it is also among the leading ones. But the technology is still yesterday's--it requires large expenditures of manual labor. I considered it the duty of the communist worker not to wait until everything has changed of its own accord. In recent years I have submitted 28 efficiency proposals and am myself taking part in their introduction. I consider such participation mandatory.

Scientific and technical progress is not only new equipment. It is without fail also the advanced organization of labor. Unfortunately, too little

attention has been devoted to this aspect of the matter. Our brigade--15 people--has been working for several years on a cost accounting basis. But all our efforts to set up smooth work and to achieve a larger saving of materials are glossed over sometimes due to the slowness of the workers of the shop administrative planning bureau.

The bureau proved to be the weak link in the organization of work. Why? Because it is outside cost accounting. I believe that it is necessary to interest supply services better in the results of their own labor. Then it is also possible to send capable specialists to them.

2. Now the question about discipline. The answer to it in many ways depends the same organization of the work of supply and production control services. Our brigade is working for the sixth year under the motto "Not One Violation of Labor Discipline and Socialist Legality in the Collective." We put an end long ago to unpunctuality and unauthorized absences from work.

But what is one to do about those cases of the loss of time, which do not depend at all on the workers? There is no material. There is idle time. Who is responsible for it? Although our labor is collective, responsibility should be personal. But it is simply impossible to find the person guilty of idle times. There is no precise specification of duties at the level of production organizers. Each one can allude to someone.

The lack of discipline and disorder arise precisely where there is "free play" in the very organization of work. When everything is efficiently organized, nothing justifies sloppy individuals. And no place will be found for them. Or else we all blame loafers, drifters and people making money on the side. But the conditions have been created for them! They can calmly transfer from place to place. It is necessary to pass a law, in accordance with which the violator of labor discipline would be deprived of high categories and at the new place could not (suppose for a year) count on the former (or else a higher) wage.

There is also no clear specification of the rights of the managers of brigades, sections and shops. A young brigade leader also does not dare at times to give a reprimand. No one is training brigade leaders--and this is bad. They simply appoint them.

It is possible to speak a long time with respect to the organization of work. We nearly do not have, after all, even specialists with scientific training in this direction. The law on labor collective, as strange as it may be, is encountering a large number of restrictions on the part of departmental instructions and regulations. Moreover, you will not find the text itself of the law in a month of Sundays. Did they publish it as a pamphlet? I have not seen and cannot get the pamphlet.

3. I also want to speak about the demands on managers.

They should first of all know the needs of the sections and not wait for complaints and requests. They should themselves identify them in open discussions and during the joint consideration of plans, assignments and



norms. Too many people like to give orders, without worrying about how it is possible to fulfill them. In response there is not the best, but the most simple and easy solution. There are many purely administrative instructions, but no technically sound suggestions. They say: "The engineer is the leader of production." They understand this in an oversimplified way and actually only give commands. They often give me, for example, such orders: "Two of you go today to such and such a section--there is a breakdown there, you will somehow manage yourself." How? But what about the assignment of the brigade, what about cost accounting?

Why have the patching of holes and the plugging of breaches become the rule? I would also like to ask this of several managers. Not only my own immediate ones, but also those who give such instructions to an entire plant: "Send people to the construction project, for the repair of roads."

And I myself want also to ask the following question: Why at motor vehicle works and tractor (including our) plants has the rule to put on the assembly line the most inexperienced and most undisciplined workers become prevalent? They, where it is not going well, will hack with a sledge hammer; where one cannot see, they will not tighten a nut completely. As a result there are many claims for replacement of the product, which could have been good. Drivers, before getting behind the wheel, reassemble Volgas and Moskviches, rural machine operators "soup up" tractors and combines. The assemblers and inspectors of the technical control division should to a significant extent support the honor of the mark. But this does not happen. It looks as if haste at the final stage of the work lets us down to the greatest extent.

Speaking in Dnepropetrovsk, M. S. Gorbachev noted that each of us must play a new tune, catch up with the rest and work with the greatest responsibility and vigor. Exactly everyone!

#### Begin With Oneself

V. Cherdintsev, a combine operator of the Rassvet Kolkhoz of Orenburg Oblast

1. If I put it briefly: to think, to seek, to support and to introduce everything advanced. I do not like those who say: "our job is minor," "the authorities can see better." This is the position of an indifferent, poor worker.

The present harvest will be the 43rd one in my life. I remember how I mastered the SK-4 combine. Everything was so-so, and the hopper was rather small, you were at a standstill for a long time while unloading. I decided to install a second hopper. And the work began to go better. While before long industry heeded our opinion and began to produce combines with a larger hopper. Thus I learned from my own experience how much depends on each of us in the acceleration of technical progress and the increase of the efficiency and quality of production.

2. Each of us, I believe, must begin with himself. Here a fitter walks about the workshop in grease-stained clothes and unshaven. From his appearance it is possible judge what kind of worker he is. You look at another work bench,

there is a pile of junk there. Does it matter when tools are scattered about? True, at times there is nothing to lay out. For example, we do not have enough drills, pullers and other tools. And if there is no wrench, a sledge hammer is used. Behave, it is equipment!

Order at the works is also determined by skill. We have foremen--wizards with their hands. For example, Vasilii Gavrilovich Zotov. He is a blacksmith, a tinsmith and a tinker. But there are no apprentices close by. First of all it is the oversight of the managers of the farm. But at the secondary vocational and technical school they are also training few specialists of the broad type.

In my youth I walked 8 km to the workshop. Before the start of the shift I lay out the tools. Unpunctuality was considered a disgrace. Even if they do not give a reprimand, it is awkward for you. That is what the strength of public opinion is. Now some people "are late" not 10 minutes, but a day and more. The Law on Labor Collectives has been passed. It is necessary to apply it in practice.

Is there really order when the brigade and link look indulgently at a careless worker, a drunkard and an absentee? They say, the guy is good, but let the authorities investigate what kind of worker he is. It is a narrow-minded position. There is no such position at a kolkhoz and sovkhos: "a good guy." It is necessary to judge a person by his deeds. In case of the summarizing of the results of socialist competition and material stimulation to take more strictly into account how the collective is fulfilling its educational tasks.

3. First of all concern about people and their working and living conditions. Further, strictness, demandingness and fairness, the ability to listen. Graduates of schools, higher educational institutions and tekhnikums are now working in the countryside. These are, as a rule, skilled, competent specialists. They have their own opinion. They want the manager to respect their opinion and to take it into consideration. An arrogant or conceited, disdainful attitude and "addressing in familiar terms" are encountered. This is the cause of production conflicts and the departure from villages of many capable, resourceful people. Not everyone, after all, will tolerate a rude chairman or brigade leader. The question of the manager and his professional, intellectual level is very serious. And the local party organizations should study it in earnest.

Another thing is the good organizer. Order in the countryside has proven itself. But here and there it is being introduced with a squeak. The system of remuneration and settlements is still unwieldy. At times even economists get entangled in them. Right here the manager must display his capabilities and help to find the optimum solutions.

To give more independence to the local links. At many kolkhozes and sovkhos they have been changed over to cost accounting and the check system of accounting and do not need watching over on trifles. Accountability is for the end result. Here at the Rassvet Kolkhoz previously there were planning meetings almost every day, now it is once every 2 weeks. And it does not matter, things are going no worse.

At a farm near Moscow I saw a device which increases the impact of the machine milking of cows and reduces to naught the coming down with mastitis. In our rayon almost no one knows about this and other such innovations. Who else but the managers are to "conduct" technical progress in the agricultural industry?

### Not Only the Performers

I. Spila, a link leader of the Lachplesi Kolkhoz of the Latvian SSR

1. I admit that I have not often pondered what my personal role is in the development of scientific and technical progress. It is modest. And still, when we acquire new equipment, we ponder how best to use it in order to obtain the greatest yield. At times we notice: in the set of machines, which is intended for the cultivation of one crop or another, a mechanism is lacking. A very important link suddenly stops. The machine operators justly demand of the managers of the farm: supply us, provide us! But it is also possible in a different way. Ponder yourself how to get out of the situation.

At present many farmers, for example, are convinced of what a great gain the cultivation of potatoes in beds yields. But with what is one to cut the furrows? Is one to wait until industry begins the series production of such units? It will be a long time and to one's disadvantage. We acted differently. We appealed for help to V. Ustinov, the chief of a department of the Scientific Research Institute of the Mechanization and Electrification of Agriculture of the Latvian SSR. Scientists developed sketches of such a mechanism, while we produced it at the kolkhoz workshop.

What did this yield the farm? The need for one cultivation disappeared. The soil is being compacted less, we are saving fuel. The yield is increasing, the product cost is less. They also produced such a unit for my partner, Karlis Toshans. In the spring the workers of Latvian Television acquainted the potato growers of the republic with our experience and told what its use provides. I believe that it would not hurt for machine builders to take an interest a little more often in the innovations which rural machine operators invent.

Stable contacts have been established here with the workers of the Priyekule Experimental Selection Station. They suggest to the link the most suitable strains of potatoes for our conditions and help to determine the most efficient techniques of agricultural technology. In the past 4 years the yield of tubers has increased from 270 to 408 quintals. On each of the 120 hectares.

2. It is possible to have good equipment and good quality seeds and still obtain small crops. Many people in such cases seek the culprits elsewhere. They try not to remember labor discipline and the sense of responsibility for the assigned job. But we must ourselves, I believe, put our own house in order. I recall that several years ago we each worked independently if only to fulfill the order. Discipline was weak. The requirements of agricultural technology were not always observed. We then set up a link of potato growers and made the remuneration of labor dependent on the end results. Now no one

shirks his duties, understanding that the common success depends on his effort. And the wage does as well.

We learned to count every minute. Recently, for example, scientists came here and conducted time studies of the work. Some people were even amazed that during the planting of potatoes here radio communication is constantly maintained with the storage. But it is advantageous to the link. And the drivers, who transport the tubers, use the vehicles better. Hence, too, the result: previously seven trucks were not enough, now we are managing with five.

3. Initiative, as is known, yields a return only if the people who displayed it receive support from the managers and specialists of the farm. They helped us, for example, to set up a good friendly collective and are not stingy when it is necessary to acquire equipment and high-yielding strains of potatoes. In order to avoid losses, they built an excellent storage. But you will hardly achieve an increase of labor productivity, if the daily life of machine operators is not in good order. I should say that at our kolkhoz both the board and the party and trade union organizations are trying to create the necessary conditions for labor and relaxation. We annually build four residences. They are built on easy terms: the kolkhoz pays half of the cost, the owner of the house pays the other half over 20 years.

Now many kolkhoz farmers have private plots and are acquiring livestock. None of them leaves the field or farm at harvest time and goes to the market to sell potatoes, vegetables and apples. The procuring agent buys the surpluses of products directly on the site and delivers them to the firm store in Riga. Imagine how much time is saved! The kolkhoz has set aside a meadow for private livestock, we are sowing grasses there and are laying in hay.

#### Association Managers

Moscow PRAVDA in Russian 11 Jul 85 p 2

[Article: "In the Main Unit"]

[Text] Today the managers of production associations respond to the questions of the PRAVDA questionnaire on how one is to implement more rapidly in practice the decisions which were adopted at the April (1985) CPSU Central Committee Plenum and the conference in the party Central Committee on the problems of the acceleration of scientific and technical progress.

The questions were formulated as follows:

1. How is one to increase production efficiency and the technical level and quality of products?
2. What are the ways of increasing the influence of the consumer on the development and improvement of production?

3. What must be done in order to completely fulfill contractual obligations?

4. How is one to change enterprises over to full cost accounting?

#### Make a Competitive Product

B. Kabaidze, general director of the Ivanovo Machine Tool Building Association

1. The task facing us has been specified with the maximum thoroughness and clarity. What we should avoid first of all in accomplishing it--now this is, I ask you to forgive the bluntness, is simulations of feverish activity: when in words everyone is "for," but the matter itself progresses very slowly. You are afraid in this case not of difficulties, but of the mechanical "delegation" of assignments, with which everyone is familiar: the State Planning Committee--to the ministry, the latter--to the all-union industrial association, from there--to plants. We--to the shops.

We seem to be doing everything as it ought to be, we are even using precisely the terms that must be. It is now entirely a matter of a truly responsible attitude toward the matter--of everyone at his own place. From the worker to the ministry--everyone has to play a different tune. Applause is good. But you, manager, personally take another look at yourself. In what is your share, what are the tasks? And let us not emphasize the word **TECHNICAL** [in boldface]--this concern seems to be for technical people alone. No, it is a matter of a **NATIONAL** [in boldface] problem.

Complacency, the narrowness of points of view--this is what must be rejected without delay. Once I was talking with the now already former director of the Ivanovo Plant of Truck Cranes. Why, I ask, do you now not export the product? The world market, he replies, does not need it. But it is necessary to specify--it does not need such a product as it now is. We talk and talk about quality. In my opinion, the enterprises must increase the volumes of export deliveries by about 10-fold. That is when it would immediately become clear who is who.

2. Frequently the consumer does not have a choice. On the other hand, it is naive to assume that the production, say, of poor footwear depends on a narrow group of people. A large mass of workers "produce" defective output, while clearly realizing this. These very people, if you give them stale bread or rancid cheese, will immediately display a thorough understanding of all the nuances of the problem and will make a claim. Now, during the search for means, speeches are being given on the introduction of new inspectorates, on the advisability of removing the technical control division from under the roof of the board of directors and so forth. This is hardly the correct solution. The party is raising the issue: it should be advantageous to the collective to produce an extra-class product.

But for the present this is still disadvantageous. On the other hand, economic levers should work in such a way that the production of defective

output would hit everyone--from the director to the janitor--in the wallet. The right to enjoy all good things must be earned. It is more convenient, of course, to divide purely formally: so many travel authorizations to these, while a few more for those: the collective there is larger. But what about the contribution? But what about the level of product quality? The profitability? The production cost? The competitive ability? This up to now has not been taken into account. Is the collective lagging? Is it receiving fewer good things? Let us try, it will exert efforts for this.

3. The rejection of obligatoriness in the interrelations of partners is a very ruinous matter. The new indicator of the fulfillment of contractual deliveries is useful, it disciplines us through a large bill. Although not all problems are solved by this. Here is an example. Our Ivanovo Machine Tool Building Production Association obtains up to 90 percent of the coke from the Cherepovets Metallurgical Combine. If it does not give us enough, we do not have a real opportunity to influence it. Contractual relations should also have strong feedback.

The matter should be organized namely as follows: if you let us down, pay. Incur a forfeit. Otherwise there will not be changes.

4. The changeover of enterprises to full cost accounting. This problem has been discussed for a decade now. In this connection let us touch upon the practice of the elaboration and adoption of socialist obligations. Do we always miscalculate the worth of the planned labor gift? For some "initiatives" merely increase the above-standard stocks. Too often in this case quantity is regarded as of paramount importance. Although it is far more important to act in the direction of those leading problems on which the collective is working. For example, the tire maker--the problem of tire life, the motor builder--the problem of motor service life and so on.

When it is suggested to an enterprise, which produces metal machining centers which they pay for in gold, to acquire, say, a primitive hog farm, it is worth pondering and calculating: which is more profitable for us--to assimilate hog raising from scratch or to still obtain gold on the world market? And this is not such an innocent question. Everything should be expedient.

Start With the Brigades

V. Pryakhin, general director of the Kaluzhskiy turbinnyy zavod Association

1. We connect our success first of all with the extensive introduction of the brigade form of the organization of labor, as well as workers' self-management, which is carried out through the councils of brigade leaders. A unified mechanism of management has also been developed on the basis of brigades. It is a question of a fundamentally new, higher level of production management.

The problems being worked on at the brigade level have also become complicated. For example, the program of the decrease of the labor intensiveness of items is mandatory for fulfillment in the shops. It is reported to each brigade. Here process engineers and designers have come to

the aid of workers. Thus creative brigades, which have noticeably increased the technical level of production, originated. One of them under the supervision of chief welder I. Fatiyev developed and introduced an electron-beam welding unit, which immediately decreased the labor intensiveness by 92,000 standard hours.

2. First of all it is necessary to bar the way of defective output to the consumer. The plant technical control divisions obviously are not coping or do not want to cope with this problem. It is also understandable: the holding up of products can lead to the upsetting of deliveries in accordance with contracts and to the loss of bonuses. The following solution is seen here: to evaluate the work of the technical control division according to the number of identified deviations from the quality.

The consumer himself can also do much here. Why, for example, is it necessary to count faulty products toward the plan of the filling of orders only on the basis that they were shipped and money was taken for them from the account of the consumer? Every claim for replacement should deprive poor workers of the bonus. This will also be dictation of the consumer.

At the same time it would be necessary to legalize the right of the consumer to choose a supplier and to reject his services. In an official manner. This would force the corresponding ministries and departments to take more vigorous steps against those who in pursuit of quantity forget about quality.

3. First of all it is necessary to raise planning work to the proper level. All the assignments should be not only practicable, but also strictly balanced. In practice the USSR State Planning Committee does not always succeed in doing this even with respect to the most important products list.

The plan of deliveries is a law. And it is necessary to do everything in order to fulfill it. We, for example, are not among the debtors. How is this turning out well? We begin production of the turbine in advance of the planned schedule with allowance made for possible delays of components and parts from elsewhere. Direct contacts with suppliers also help very much.

4. It is necessary to begin with brigade cost accounting. Without having achieved success at the local level, it is no use thinking about the plant level. Incidentally, all the conditions for this have already been incorporated in the very basis of the brigade form of the organization of labor. The set--the block of a finished item, the completed stage of a job and so on--has become the planning and accounting unit. The sum of the brigade assignments fits exactly within the shop or sectional design and technological set, which has all the cost accounting parameters.

It is impossible to formally unite machine tool operators who are working close by. Sometimes even the framework of the section had to be extended or narrowed. And everything is in order to develop the brigade into a unified set, a stage of the work.

Cost accounting, in turn, also requires the more precise "attachment" of the wage to the end results of labor. It is possible to solve this problem, if

one changes over to remuneration not according to the rates, but according to the value of a standard hour. In such a case the rates and the norm setting of labor would be separated. But the aspiration to obtain the maximum bonus would make it incumbent to cope with the assignment on the decrease of the labor intensiveness of operations.

Today We Are Not at a Parade

G. Koshelenko, director of the Odessa Association of Heavy Crane Building imeni Yanvaraskogo vosstaniya

1. At the works, which govern the technical level, not only the machine tool operator, but also the level of technology should guarantee the quality of products. Therefore, it is necessary to adopt a policy of unmanned, high precision technology.

It is necessary to make more rapidly the equipment for such technologies. In order to speed up the process of its development, it is important to shorten the time of the coordination of the placement of new items on the conveyor. Having built a new crane, we collected signatures for 2.5 years. Here the say of the chief designer and the consumer should become decisive.

Pricing has an important influence on the acceleration of the introduction of new equipment. It is easy to make it flexible. In a machine the advantages are always obvious. For example, new materials were used and the client agreed to pay extra. In such a case it is possible and necessary to do without middlemen.

It is necessary to strengthen the contact of production with science. How and where is one now to find an idea? Obviously, it is necessary to set up consulting firms and to allow enterprises to use a portion of the profit for the payment for developments and the conclusion of contracts on the introduction of new processes. It is time to exempt research and design centers from the formal indicator of the efficiency per ruble of expenditures. Expenditures are the business of the plant itself. It purchases a machine, an idea once, not twice and not three times.

Plant science can make a large contribution to the accomplishment of technical progress. The enterprise can see better how many designers or process engineers to keep on the staff and how to pay for their labor. It is not worth controlling the staffs here.

2. When our enterprise placed an order for bearings for new machines, they appointed the Vinnitsa State Bearing Plant as the supplier for us. We began to receive assets--that is not the point. The Odessans gave the related plant accessories and agreed to a new price--and they solved the problem jointly. But what troubles all this presented! Trips, correspondence, permits, violations. It seems that it is necessary to legalize production cooperation. Both within a single ministry and between departments.

In my opinion, the time has come to reject the system of the distribution of all products in accordance with orders. Why? The producers of poor quality



products will themselves begin to fuss when consumers receive the right of choice of a supplier and avail themselves of the opportunity to purchase if only a portion of the machines, tools and materials without getting agreement with the ministry.

It is necessary to introduce everywhere product certification with the active participation of the consumer. This has a significant influence on the improvement of items.

3. Prior to being appointed to the position of director of the association I worked for many years at Stroygidravlika. I recall that we were the first in the country to develop hydraulic units. For that time the product was unique, no one knew about it and, thus, there were also no orders. We appealed to planning organs to distribute the items. We receive the following reply: since no one planned the new equipment for you, sell it yourself. We appealed to advertising for help and inserted an advertisement. Consumers followed one after the other.

Using self-distribution, we knew neither reproaches nor fines. Here is what happens when the consumer himself chooses a supplier for himself, when the parties are mutually interested in having reliable, long-term relations. It is impossible to confine oneself to a single producer. I am for two or three related plants. If one breaches the contract, it is possible to turn to the other two for help. Then whoever does not budge and marks time, will himself ponder why he found himself on the side.

4. The enterprise has been built, the collective has been set up, working capital has been allocated--work, as they say, earn yourself a living. Unfortunately, managers are deprived of such independence. They pose a task for them with all the known things: the numerator, the denominator, the ready-made answer. It turns out that there is no stimulus to manage thoughtfully, assiduously. Contracting brigades, which work for the end result, are being set up here. The matter is advantageous. But only for the brigade. The plant as a whole cannot change over to cost accounting: the staff, the capital and nearly all its activity are strictly regulated from above.

Now from another "opera." We are building a new shop. Using my own discretion, I would fit the technology to my ground cranes: the shop would turn out to be lower and, hence, less expensive. No, they provided a design of a "skyscraper" with overhead cranes and stated the sum of the expenses. If you do not assimilate, they will take the money away and also punish you. And we sink piles many meters long and in the full sense of the word drive money into the ground.

It is necessary to reject the system of the detailed planning by superior organizations of all expenditures. Let the enterprise itself decide how and where to use the assets. Otherwise the talk about full cost accounting is useless. Today we are not on parade.

## Direct Ties Are Needed

N. Chikirev, general director of the Stankostroitelnyy zavod imeni Sergo Ordzhonikidze Association

1. One should begin, perhaps, with engineering personnel and their skills, since the increase of the technical level and the competitive ability of the equipment being produced to a significant degree depend on the practical qualities of the engineer. But for the present too few material stimuli for the attachment of highly skilled workers at the enterprise are at the disposal of the director. Apparently, it is necessary to improve the system of the remuneration of the labor of engineering and technical personnel.

I would put in second place the planning of the production of new equipment. In my opinion, a system of the stimulation of enterprises for the economic impact in the national economy, which the equipment being produced by them yields, should be developed and introduced.

2. Given the existing system of the acquisition of equipment the consumer does not have the possibility of choosing, since assets and the order are issued specifically to one producer plant or another. But since the right of choice does not exist, it is difficult to influence effectively the technical level of equipment.

The influence of the consumer can also be adverse with respect to technical progress, since, when ordering equipment, the consumer is oriented in most cases toward his own possibilities. That is why we are forced to produce at times simple machine tools which do not require high skills during attendance.

3. When drawing up the production plans for a year and the five-year plan it is necessary to take into account the demand of clients for one model or another of a machine tool, as well as "the backlog of orders" for the given model at the moment of the drawing up of the plan and for the foreseeable future.

Ministries and departments should, in my opinion, submit the range of special equipment to the supply plants not less than 1.5 years before the start of delivery. This will make it possible in good time to prepare production and to order components.

The enterprise, in my opinion, should specify the time of delivery jointly with the client on the basis of the conditions of its readiness for the installation and use of the equipment. Or else it turns out that we are exerting efforts in order to fill the order of time, while the consumer is not ready for its acceptance. The just produced equipment has to be sent to the warehouse. For example, we produced in 1981 for the Kama Motor Vehicle Works 14 automatic lines for the machining of truck engine cylinder blocks, but they began the start-up of these lines there in 1985.

4. Apparently, the first stage of the changeover to full cost accounting is the proper formulation of the production program in which the enterprise is specialized. A fixed sequence of the important problems, which the enterprise

should solve, should be established. And here the direct contact of the producer and the consumer is very important. Precisely they should come to an agreement, and not the State Planning Committee and the ministry behind their back. What specifically the national economy needs, how many and what items--this is what should be primary when drafting plans. Everything else is secondary.

As a result the group of planned products should be established in physical terms, after which it is easy to give the plan expression in value terms. It is possible to achieve by this the elimination of the gap between the physical and value indicators of the plan.

The effectiveness of cost accounting to a significant extent is governed by the quality of pricing, since the basic principle of cost accounting--self-sufficiency and the derivation of the profit which is necessary for expanded reproduction and social progress--should be realized precisely through prices.

Prices, in my opinion, should be regulated in the process of the interrelations between the supplier and the consumer. The basic principle in this case consists in the full reimbursement of the expenses of the consumer and the derivation of the profit necessary for the development of the enterprise, at the same time as this the level of prices should correspond to the basic advantages of the consumer.

The consolidation of cost accounting in many ways depends on the extent to which the enterprise is the "owner" of the derived profit. Now, when every ruble of profit is bound by the financial plan, the enterprise does not dispose of its own profit, but uses it in strictly established directions. This does not affect in the best way the technical development of production.

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#### Scientists

Moscow PRAVDA in Russian 13 Jul 85 p 2

[Article: "The Union of Thought and Deed"]

[Text] Today scientists respond to the questions of the PRAVDA questionnaire:

1. What is the role of the science which you represent in the acceleration of scientific and technical progress?
2. What needs to be done to increase the creative activeness of scientists?
3. What, in your view, are the means of the closest cooperation of science and production?

## The Guarantee of Success

Academician of the Ukrainian SSR Academy of Sciences N. Novikov, director of the Institute of Superhard Materials of the Ukrainian SSR Academy of Sciences

1. Not that much time--a little more than 20 years--has passed from the first experiments on the synthesis of diamonds from graphite to the complete supply of all the sectors of production of the country with diamond and other tools made of superhard materials. The obtained impact is estimated in a saving of billions of rubles. But the main achievement consists in the significant increase of productivity in case of the introduction of diamond machining, which has increased by tens and hundreds of times, and in the substantial improvement of the quality of optics, items of instrument making, electronics and machine tool building and power machinery.

Ultrahigh pressure equipment and plasma, laser and vacuum technology are making it possible to radically restructure the tool industry. New types of productive low-waste processes of machine building are being developed on the basis of recently developed diamond and other tools of guaranteed durability and high quality.

We are closely connected and are maintaining creative cooperation of long standing, while overcoming at times difficult intersectorial barriers, with many enterprises of the Ministry of the Machine Tool and Tool Building Industry. When our developments are implemented by them, this makes it possible in a short time to shift from the production of individual batches of items to their mass production at enterprises of the sector which is engaged in the manufacture of tools made of superhard materials. Such durable permanent contact is for the future as well a reliable guarantee of success in the acceleration of scientific and technical progress.

2. The creative activeness of scientists is checked at times by the lack of the necessary advanced instruments and industrial equipment, which is especially having an effect now, when engineering centers, one of which has also been set up at our institute, are undergoing greater and greater development at the republic Academy of Sciences. Its advantages are unquestionable--an opportunity is afforded, by availing oneself of the assistance of interested ministries, to develop the necessary equipment in the shortest possible time.

3. Our institute annually turns over 20-30 developments for extensive use to interdepartmental and departmental commissions of various sectorial ministries and departments. During the years of the current five-year plan there have already been more than 150 such completed proposals for extensive introduction. And all these are materials, tools and equipment, which in their indicators are frequently superior to the known foreign analogues or are not inferior to them. And it is very annoying that very often such developments are still not being taken up at the proper time by ministries and the USSR State Committee for Science and Technology and are not becoming the subject of decisions of their collegiums for extensive circulation in the sectors. It is considered that this, they say, is the business of the institute itself. But such an approach is utterly incorrect. It is necessary

to display, undoubtedly, greater efficiency and to make more active use of material and moral stimuli to increase the activeness of workers--from the laboratory assistant to the academician. Otherwise many achievements of science may remain for long years merely in the arsenal of individual enterprises, but it is necessary to provide them with a wide road on the scale of the sector and the entire national economy of the country.

#### Notice and Evaluate

L. Kurilovich, deputy director of the Scientific Research Institute of the Leningrad Elektrosila Association

1. When introducing scientific methods and instruments a large role belongs to applied science specialists. They, incidentally, are capable of enriching with their ideas and advancing basic science as well, since, being linked with industry and working in it, they are capable of more rapidly noticing, evaluating and suggesting for dissemination innovations, whether it is a question of an invention, a new method or a new approach to the study of a complex process. In other words, nothing other than a scientific approach to the development of models of new equipment and new technologies, to the organization and economics of production is called upon to ensure the desired pace of technical progress.

2. In order to increase the creative activeness of scientists, it seems, it is mainly necessary to increase the level of organization. What do I mean? The entire set of factors, without which fruitful work is inconceivable. It is legitimate to group with the most important ones, for example, the attitude of the administration toward scientific associates. They should constantly feel necessary to production and see that their proposals, developments and ideas were being realized in practice, and should not sense a disdainful attitude toward their ideas and demands on the improvement of the scientific equipment of the labor of specialists.

Problems, as a rule, are solved collectively by researchers. Therefore, it is of no small importance who supervises the research. Not only a most competent, but also a rather strong-willed manager, who enjoys in addition great moral authority, should be in charge of the scientific collective of any level. All these qualities in a normal moral atmosphere are easily determined by public opinion and by extensive and democratic discussion at seminars and conferences, when it becomes clear to everyone "who's who" and "who did what."

It is impossible to tear apart the concept of activeness and productivity as applied to scientific labor. For in the final analysis society is interested precisely in the increase of the output of the specialist. But it is frequently also necessary to help him in this--to provide the workplace of the scientist with modern office equipment, computers and terminals and to cut short any attempts to divert specialists for the fulfillment of duties which are not characteristic of them--from the weeding of root crops at affiliated farms during work time to the drawing up of various reports.

Along with the accurate assessment of the abilities of the scientist, which it is necessary and possible to do, not the last, though also not the main place belongs to the remuneration of labor. Here it is not worth proposing anything particularly new--it is necessary to bring the system of remuneration as close as possible to the essence of the basic principle of socialism "From each according to his abilities, to each according to his labor." Which, incidentally, the experiment on improving the system of the remuneration of the labor of designers and process engineers, under the conditions of which the engineers of our association have been working successfully and gladly for 2 years now, is promoting to a certain degree.

3. The integration of science and production is being successfully developed at many associations, particularly at our Elektrosila Association. The design of a unique 300,000-kW cryogenic turbogenerator was developed in close contact, for example, with all the scientific subdivisions of the institute, the scientific organizations of a number of sectors and the USSR Academy of Sciences and plant designers. The prototype of this machine has been produced and is in operation, affording new prospects in the development of power engineering. While the practical experience of its development confirmed once again: first of all the enterprise, which is the producer of a specific product and in whose hands resources are concentrated, is capable of uniting and concentrating the efforts of large collectives on the solution of major problems. It also ensures better than any of the coperformers a high level of the technology of the production of the item.

#### From the Idea to the Series

Academician A. Aganbegyan

1. I am an economist and with reference to the problems of scientific and technical progress deal, first, with the economic evaluation of its results and, second, with the formation of the organizational and economic conditions for its acceleration, including in the area of planning, management and stimulation.

As far as the economic evaluation of scientific and technical measures is concerned, here only such technical innovations, the introduction of which leads to an increase of national economic efficiency, that is, to the overall efficiency of the use of all types of resources--labor, materials expenditures, fixed capital and capital investments--can be called progress (if we do not take the measures which are connected with labor safety techniques, working conditions and environmental protection). Meanwhile, that is far from always the case. For example, a significant portion of the robot-manipulators being produced are being used during loading and unloading and in stamping. A large robot costing 40,000-50,000 rubles frees workers with an annual wage of less than 4,000 rubles, it operates unreliably and requires specific expenditures for repair and maintenance. In this case the aggregate expenditures of living and embodied labor do not decrease, but even increase. And from an economic standpoint this will be not progress, but regression, no matter how technically interesting this robot is.

Unfortunately, this case is quite typical. The robot-manipulator is expensive and unreliable because it is being produced in a semiprimitive manner at many plants. If the series production of advanced modular-design, multipurpose robots is set up and they are incorporated in practice in an automated flexible manufacturing system for welding, soldering, painting and so forth, robotics proves to be extremely efficient.

And it is annoying that, having begun in nearly every ministry and at many plants to produce these manipulators at three times the cost and with double the weight, without sparing assets for this and by paying tribute to fashion, for two five-year plans now we have not been able to find the assets for the renovation of the sole plant in the country for the production of powerful lift trucks in Lvov, while one such loader (which, incidentally, is less expensive than a robot) frees up to 10 loading hands from difficult operations. But there are millions of loading hands in the national economy. Or, by putting robots at individual sheet-stamping presses and applying here large forces and much capital, we will simply not develop properly the use in sheet stamping of the rotary conveyor lines designed by Academician L. N. Koshkin, which increase productivity by 5- to 10-fold with a significant increase of the output-capital ratio and a decrease of the production area in use. Scientific and technical progress, as is known, is not an end in itself, but a means of increasing the efficiency of social production. And it is simply impossible to be satisfied today with the state of affairs, when the impact from all scientific, technical, organizational and economic measures amounts annually to only a 3-percent increase of labor production and a 2-percent saving of fuel and raw materials with the simultaneous decrease of the output-capital ratio on the average by 3 percent, which in many ways depreciates the achieved results. It is necessary to immediately put an end to such a capital-intensive form of technical development, which in many ways is wasteful for society.

Revolutionary changes and a transition to highly efficient technological systems, which are based on equipment of the latest generations, are needed in scientific and technical progress. In this connection economists are faced with important tasks on the choice of the most efficient technological systems, the mass production of which will make it possible to speed up significantly the socioeconomic development of the country.

2. I would first of all place "activeness" in inseparable connection with effectiveness, for in the final analysis it should be realized precisely in this.

Any activity, including scientific activity (I have in mind applied research, in which the overwhelming portion of the scientists are employed), yields good results first of all wherever it has a clear goal orientation and is oriented toward the obtaining of a specific national economic impact. In many cases this does not now exist. Thus, every scientific institute of the coal industry, including the one located in the coal basin, is simultaneously performing tens, and at times hundreds of themes, the results of which are somehow being used at various mines and are reflected in the figures of the "conditional" saving. The "saving" at times is small, while the technical and economic indicators of the "affiliated" mines are nowhere worse--labor

productivity decreases annually, the production cost and the capital-output ratio are increasing, the difference from the leading levels in the world in the coal industry is not decreasing, but is increasing.

The reason, in my opinion, lies in the incompleteness of scientific and technical operations and their inadequate orientation toward the end result.

3. Under our socialist conditions the most important conditions of the integration of science, technology and production are:

--first, the state plan as a powerful lever of the use of the achievements of science and technology in production. A typical example is the rapid increase of the number of nuclear electric power plants, for which it was necessary in a planned manner to build the Atommash Plant, to set up specialized construction organizations, to allocate capital investments and others;

--second, the organizational forms of management, which provide for the uniting of plants with scientific research and design and technological organizations into unified scientific production complexes. As was indicated at the conference in the CPSU Central Committee, a powerful stimulus has to be given to the work on the formation of new scientific production associations. In this connection the significant broadening of the plant sector of science in connection with the inclusion of many sectorial institutes and design bureaus within large production associations will also be of great importance;

--third, the development of a set of economic levers and stimuli, which interests labor collectives in the output of technically more advanced and highly efficient products and the introduction of new technology. There are here the changeover to a better system of prices, the self-financing of retooling, the expansion of the role of credit, steps on the subordination of the producer to the requirements of the consumer and so on.

In order to accomplish all this, it is necessary to do away with the departmental, organizational, planning, financial, psychological and other barriers between science and production and to establish in fact a continuous flow of scientific research and technical development into practice.

The Authority of Knowledge

Academician I. Obraztsov

1. The experience of our leading higher educational institutions shows: wherever serious scientific research is being conducted, especially in the promising directions of science--new technologies, microelectronics, computer technology, information science, laser technology, the instructors successfully defend their dissertations, while the thirst for knowledge increases among the students, and they together with the instructors perform at a high scientific level practicable course and graduation projects with their subsequent introduction in practice. For example, at the Taganrog Radio Engineering Institute 1 day a week the students are engaged in scientific research. At this higher educational institution it is conducted through the



entire cycle--from the idea to the production of a model of the new item. This became possible because an educational scientific production complex was organized. A scientific research institute, a design bureau, sectorial laboratories, a computer center, a pilot production base and student design bureaus are a part of it. This continuous research chain helped to increase significantly the efficiency of scientific research, to speed up introduction and to properly unite the educational and scientific processes. At the higher educational institution it was possible to develop jointly with enterprises of the sectors a microprocessor, which does not have analogues in world practice, in an unusually short time--8 months.

I would especially like to emphasize that the most favorable conditions for conducting fundamental and basic research exist at higher educational institutions. And at present, when in the RSFSR Ministry of Higher and Secondary Specialized Education research has been organized not at the "chair--enterprise" level, but at the "Ministry of Higher and Secondary Specialized Education--sector" level, this advantage of the sector of science of the higher educational institution has appeared in the most favorable manner. We were able to concentrate the significant forces of scientists of higher educational institutions on the solution of major national economic, intersectorial, sectorial and regional problems through comprehensive goal programs.

2. An enormous number of developments of higher educational institutions are not being introduced. There are many reasons: the lack of confidence of sectors in the developments of higher educational institutions so far has not yet been overcome, shortcomings exist in planning (the results of the developments of higher educational institutions are not being included in the sectorial plans of introduction) and resource supply, the pilot experimental base of higher educational institutions is weak. We evaluated it and came to the conclusion that nearly half of the developments cannot be implemented by the forces of higher educational institutions alone. But introduction is the cherished goal of any scientist and the basis of all the ensuing consequences: recognition, authority, moral satisfaction and material status.

The necessary conditions for creative work itself must also be created: higher educational institutions must be furnished with the latest equipment and instruments and modern computer technology, the necessary materials and reagents must be supplied, modern educational laboratory buildings must be built. Students should study under the best conditions and should study with anticipation, otherwise poorly trained specialists will not speed up scientific and technical progress, but will hinder it. At a number of higher educational institutions we have begun the goal-oriented training of specialists for science and industry.

3. With reference to the conditions of the higher school the establishment of educational scientific production complexes seems most advisable. But it is hardly wise to surround every higher educational institution with a ring of scientific research institutes, design bureaus and pilot works. We took the path of the specialization and cooperation of higher educational institutions. Joint computer centers and metrological and testing laboratories of higher educational institutions provide a substantial saving of state assets. But

until the higher school is recognized organizationally and with respect to planning and finances as a scientific organization, its enormous scientific potential will be used extremely inefficiently and the level of training of specialists will lag behind the demands of the times.

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